

A CHILTON

PUBLICATION

The IRON AGE

THE NATIONAL METALWORKING WEEKLY

MENTS PAGE 2

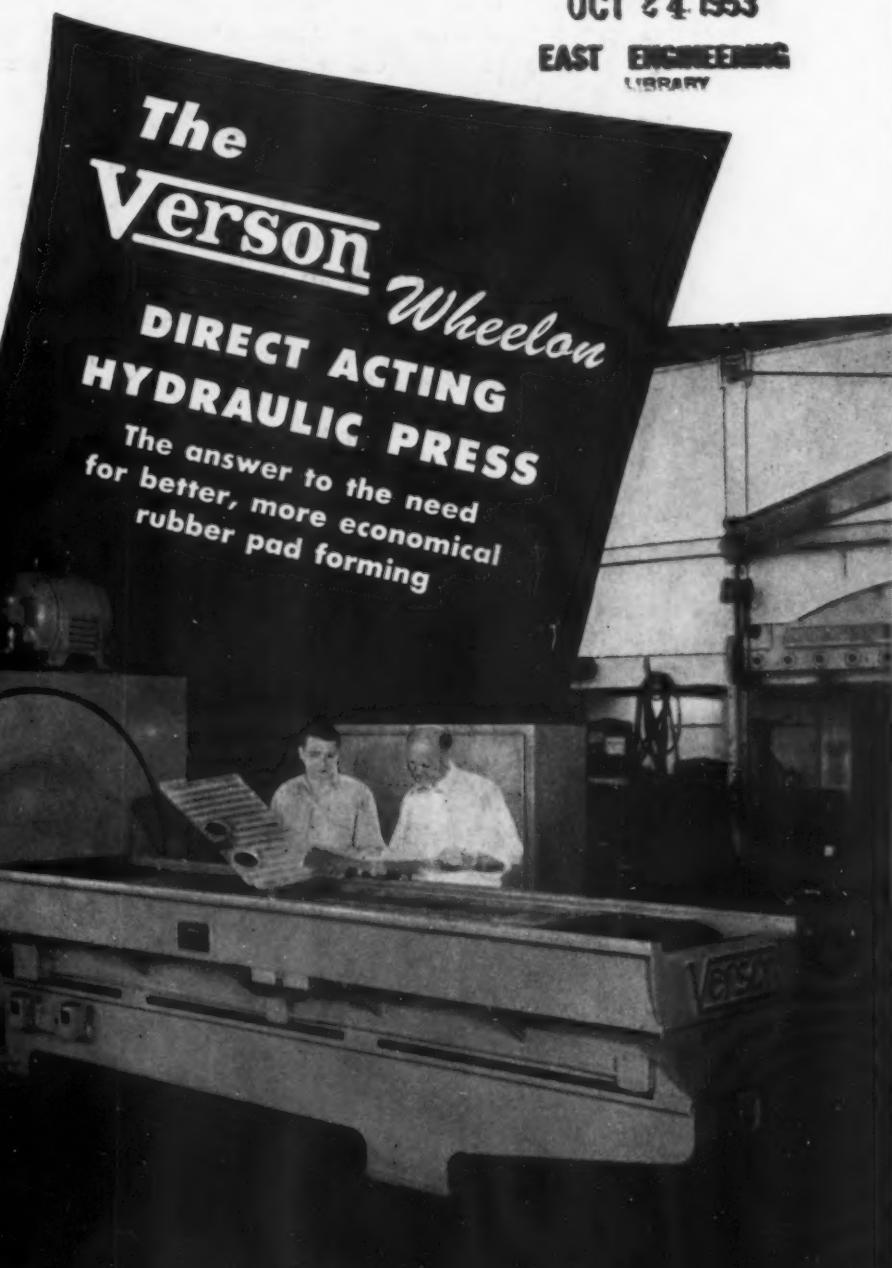
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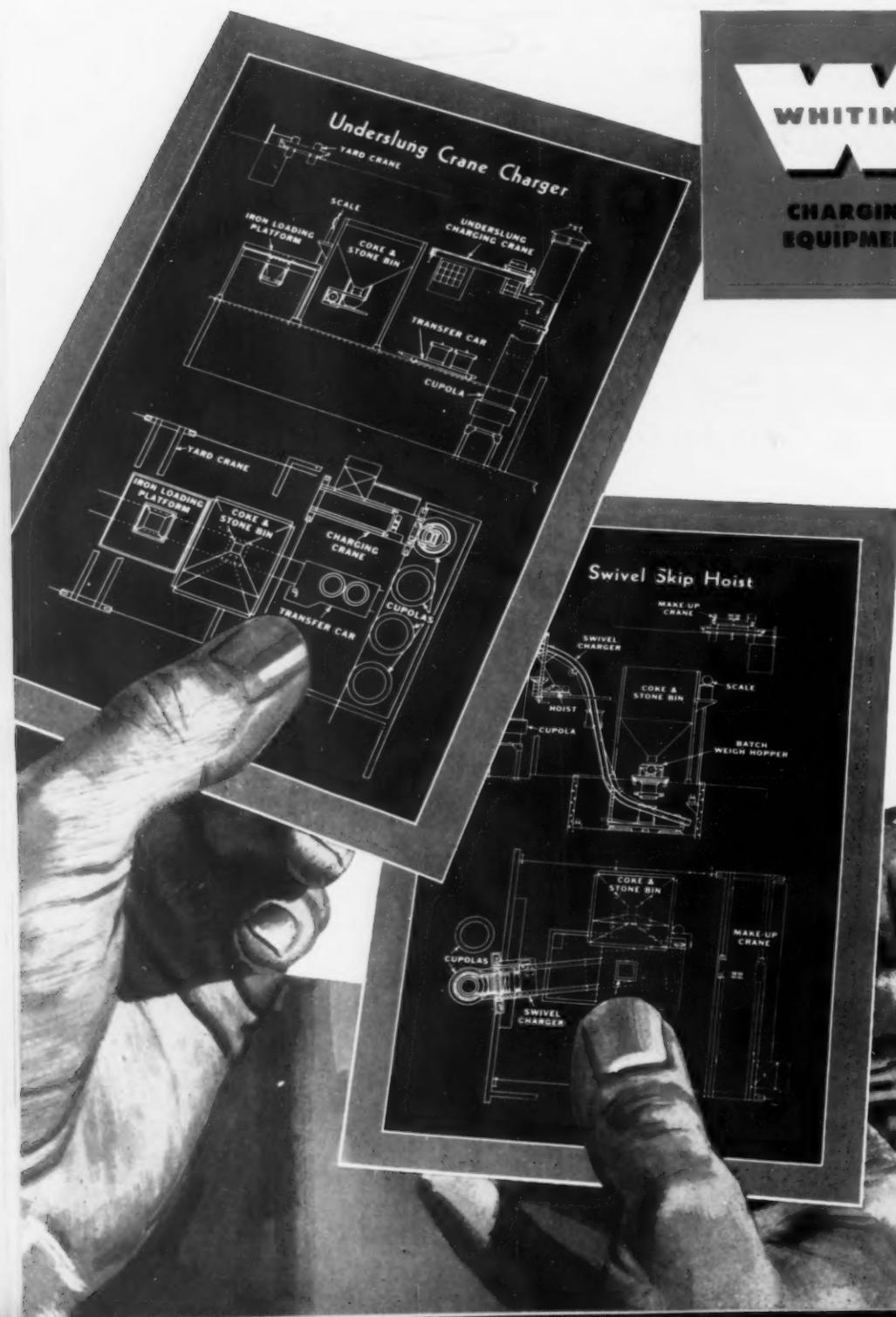
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The Iron Age

Vol. 172, No. 14, October 22, 1953

*Starred items are digested at the right.

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DIGEST of

NEWS DEVELOPMENTS

RED CHINA PUSHING INDUSTRY BUILD-UP — P. 5
Iron Age correspondents glimpsed behind the Bamboo Curtain at the Communist Trade Fair in Leipzig. What they saw was a bootstraps operation by the China government. Heavy industry is being expanded. Raw material production is climbing. Transportation is being built up. But skilled technicians are few.

UNIONS FEEL OUT NEW LABOR BOARD MEMBERS — P. 6
Organized labor, now sharpening its arguments for revision of the Taft-Hartley Act, is keeping a wary eye on the composition of the new National Labor Relations Board. Labor feels the board is likely to favor management, and may be kinder to industry-wide organization. Other labor trends reported.

NEW AGENCY READIES SMALL BUSINESS AID — P. 6
The government aid program to small firms is taking shape as Small Business Administration opens regional offices across the country. The agency stresses that it is not just a lending agency, points out it considers its advisory services just as important as loans. Bank co-operation is emphasized.

LABOR WINS ROUND IN INDUSTRIAL DEAFNESS — P. 6
Compensation case victory of a Wisconsin drop forging plant worker for occupational deafness brought the day of reckoning for the industrial noise problem a little nearer. Other cases in the state will be ripe for courts "Loud" industries will bear the brunt. Defensive steps these industries should take.

NEW MODEL SCHEDULING MAMMOTH AUTO JOB — P. 7
With a parts list that may run 15,000 items alone, the scheduling of new model manufacturing is one of the automotive industry's biggest organizational jobs. Make or buy is one of the major questions. Close cooperation between departments is a must. Plant facilities, labor tooling are other vital considerations.

HOPE GONE FOR BALANCED BUDGET IN 1955 — P. 7
Official word that the budget can't be balanced in fiscal 1955 points up strong possibility of new or higher taxes next year. See '55 deficit of \$9.5 billion. Congressmen see possible compromise cut of 4 pct in corporate tax instead of scheduled 10 pct. Barring crisis, EPT will go Jan. 1, 1954.

THE IRON AGE

the Week in Metalworking

ENGINEERING & PRODUCTION

CAST REFRactories LOWER FURNACE COSTS—P. 113
All-cast heat treating furnaces offer the possibility of better balanced operation, low heat loss and high output. Elimination of brick construction substantially reduces overall costs and construction time. Repairs are made easily if necessary, but 8 months' operating experience shows no difficulties.

HOW STABLE IS Ti IN VITAL OPERATING RANGE—P. 116
Instability of some titanium aircraft alloys at temperatures where they are most useful, 600° to 900° F, poses a problem for designers. To meet this problem, Westinghouse studied effects of aging on an iron-chromium-titanium alloy. Samples showed refinement of grain structure, higher tensile strength.

BRAKES AID TO HIGH TEMPERATURE STUDIES—P. 120
Brake tests have been used to study high temperature physical properties of both metals and ceramics at Bendix Aviation. Tests are designed to show effectiveness of brakes for military and commercial aircraft. Simulated brake stops turn the metal disks nearly white hot, 1800° F and up at the surface, in seconds.

SHOP APPLICATIONS HIGHLIGHT PEI FORUM—P. 122
Test methods, standardization and industrial applications held major interest at the recent shop practice forum of the Porcelain Enamel Institute at Columbus, Ohio. Items of special interest: Roller Cooling for Quality Frit; One Coat Gray Speckled Titanium; Waste Pickle Liquor Disposal.

WHICH HARD CHROME SOLUTION IS BEST?—P. 126
Chrome plating solutions of the fluoride-catalyzed type offer many advantages over the standard sulfate baths. Deposits are better distributed, harder and have less effect on the fatigue life of the base metal. Fluoride baths also have better throwing power, faster deposition rate, higher cathode efficiency.

NEXT WEEK—HOW TO CUT STEEL CLEANING COSTS
Blasting of hot-rolled steel strip and sheet with abrasive steel shot has cut cleaning costs sharply in many processing plants. Shot is hurled at high velocity from bladed wheels rotating at 2250 rpm. Directional control is acquired without using compressed air. Units may be used alone or added to existing pickling lines.

MARKETS & PRICES

STEEL PASSES TRANSITION TEST IN GOOD SHAPE—P. 55
The steel industry has passed its market test with a good score—the ingot rate is still in the mid-nineties. Cancellations, though still sizable, are past their peak. Inventory correction is about two-thirds completed. Freight absorption and premium price cuts represent dollar concessions but not basic price weakness.

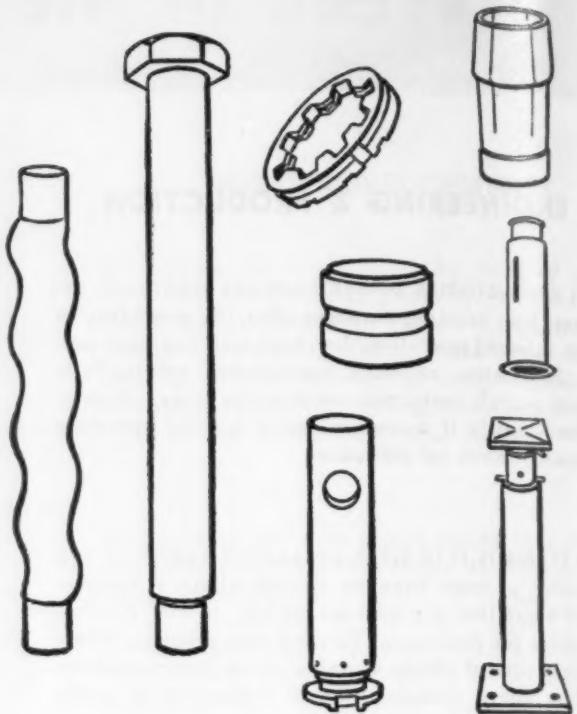
SEE PLATE CARRYOVERS INTO FIRST QUARTER—P. 56
While many steel items have eased a few remained as scarce as ever. Plate is one of these. Several mills are talking of plate carryovers into the first quarter. Purchasing men feel easing will come in February but several sources of pent-up demand won't let the plate market get really soft for some time.

MAGNETS ATTRACTING MANY NEW MARKETS—P. 57
Tremendous growth of permanent magnet market, already rated at \$30 million annually, is just getting started. Today the military takes 80 pct but new industrial uses promise to shoot demand to new peaks. Carboloy, fourth largest producer, has opened a new plant and is aiming for 30 pct of total output.

RECESSION SAFEGUARDS ARE TONICS ONLY—P. 85
Washington measures to halt recession will prove their merit but they should be considered tonics only. Industry will continue to bear the load of sustaining prosperity. Production-demand today has rounded the corner to moderation. The boom's win streak was broken. Retailers are shrewdly watching inventories.

PREMIUM STEEL PRICES HITTING THE SKIDS—P. 145
Premium steel prices are fast disappearing as producers are forced down to competitive levels in order to book business. But prices at regular mill levels are firm. Steel market outlook is brighter than it has been for many weeks. Volume of deliveries may stay high through the first half of next year.

STRIKES HIT CHILEAN COPPER PRODUCTION—P. 148
Defying Chilean government appeals, workers have struck at Anaconda's Chuquicamata and Potrerillos properties. Chile's President calls the action "communist inspired." Still wait settlement of U. S.-Chile copper deal. Copper market feeling better but the trend will be down. Scrap's up some more.



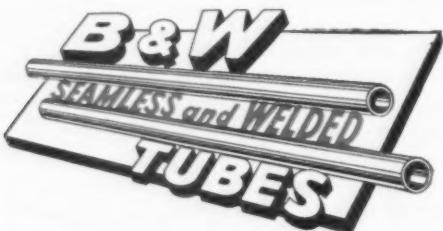
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Editorial

The Iron Age

FOUNDED 1853

More About Getting Ahead

NOT too many years ago a leading pharmaceutical company made a household expression out of its slogan "your best friend won't tell you." The idea was that you ought to know but it was hard to get anyone to tell you.

Similar situations face those who want to "get ahead" quickly. There is nothing wrong with such burning ambition. But often the competition is keen and the runners-up great in number.

Let's assume you are one of those who wants to get there fast. Let's assume too that you and others have what it takes—that with all things being equal it is a hard choice for management to make.

There are some things the boss just won't tell you. Maybe he isn't quite aware that he spots these things. And maybe he doesn't know that he doesn't like them.

The fellow who knows what his best friends wouldn't tell him has an inside track when the race is close. Let's say you have the brains, the achievements and are "in." What are the little things that might tip the scales against you—unbeknownst to you or to the boss? Here are a few things no one ever tells you:

¶ Keep your shoes shined and your heels straightened if you are on your way up. It doesn't cost much but it is valuable.

¶ When in the front office don't show that inch of flesh when you cross your legs. Wear garters or socks that will stay up.

¶ Wear a hat. Do you see many of your officials coming to work without a hat?

¶ If your suit looks as if you slept in it that's the way it will look to those who are "looking you over."

¶ Better leave wild neckties to those who are already on top. They can wear what they like—you can't if you want to get where they are.

¶ Shave once a day at least and don't gloss over whiskers. Some bosses become entranced looking at the stubble you missed. They might secretly feel like being that way. But they can't and neither can you if you want their job.

¶ Don't use a toothpick while out to lunch with the bosses. Don't pick your teeth with matches, match holders or forks—it centers the wrong kind of attention upon you.

Of course if you don't give a hoot about reaching the top pay no heed to this advice. You may be happier in the long run. And then again maybe they will make you top man anyway.

Tom Campbell

Editor



How WESTINGHOUSE saves \$37,000 yearly at its Trafford, Pa. Foundry

■ This plant formerly loaded and unloaded bagged material, handled barrels and stored patterns by manual methods. Today fork trucks have mechanized all these operations. Result: *an annual saving of \$37,000.*

In the warehouse, for example, the fork trucks now stack materials on pallets—right up to the rafters. Indirect benefits: space saving, fewer accidents, less material damage. Direct benefits: substantial savings in labor costs.

Fork-truck handling and tiering of patterns eliminated back-breaking work, increased storage capacity 500% and made additional labor savings.

Unloading bagged material (wood flour, sea coal, mogal, pitch, etc.) and fire brick (formerly man-handled one at a time) is now done in palletized unit loads—another big cost saver. And still more money is saved by handling barrels with a Baker 4-Purpose Carriage truck and drum shoes.

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Baker

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BAKER-LULL Corporation, Subsidiary, Minneapolis, Minn.
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Dear Editor:

Letters from readers

Foreman Speaks Out

Sir:
I have noted your editorial, "The Foreman Speaks Out," in the Aug. 13 issue and would appreciate receiving a copy or two if they are available.

G. D. WILLIS
Supt. of Maintenance
Allis-Chalmers Mfg. Co.
Cedar Rapids, Iowa

Cast Refractories

Sir:
Referring to your Oct. 8 issue, the Newsfront page, could you please tell me who makes the cast refractories for heat treated purposes?

W. W. MCKAIG
Cumberland Steel Co.
Cumberland, Md.

These refractories are made by the General Refractories Co., 1518 Locust St., Philadelphia 2, Pa. The material used was Litecast 50. An article on this subject appears on p. 113.—Ed.

Promote Diemaking

Sir:
In your Oct. 1 issue, p. 65, there is an article "Tool, Die: Film Recruits Trainees." In this article you refer to the National Tool and Die Makers Association.

We would like to have the address of this association as we are very much interested in obtaining the 22-minute, color and sound, motion picture which follows an apprentice through a 4-year, 8000-hr course.

DEWEY MATSON
Director of Training
Bendix Aviation Corp.
Kansas City, Mo.

The National Tool & Die Makers Association is located in the Tower Building, Cleveland 14, Ohio.—Ed.

Best Casting Method

Sir:
I have read the fine article "Parts Needs Determine Best Casting Method" by David Lee VonLudwig in the Sept. 3 issue. If reprints are available, will you please mail four copies to me?

R. P. ANDERSON
Manufacturing Development
Caterpillar Tractor Co.
Peoria, Ill.

Flexible Fixture

Sir:
We were very much interested in the article "Flexible Fixture System Saves on Tools" which appeared on p. 138 of the Aug. 13 issue. We would

appreciate receiving four reprints of this article as soon as possible.

W. W. WILSON
Equipment Engineer
International Harvester Co.
Chicago, Ill.

Noncorrosive Flux

Sir:
Please send at your earliest convenience five reprints of an article that appeared in your Sept. 3 issue. The article was written by William Gale of McCord Corp. and entitled "Improve Your Soldering With Noncorrosive Flux."

J. C. HOFF
Kaiser Aluminum & Chemical Sales, Inc.
Detroit, Mich.

Sir:

We would like to obtain 12 reprints of your article "Improve Your Soldering With Noncorrosive Flux" as it appears in the Sept. 3 issue.

J. H. HINMAN
Technical Advisor
Revere Copper & Brass, Inc.
New Bedford, Mass.

Rare Earths

Sir:
The June 4 issue contains an article in which I am greatly interested.

I would appreciate it very much if you could send me tear sheets on this article entitled "Rare Earths in Stainless Brought Up to Date."

G. C. OLSON
Atlas Steels Limited
Welland, Canada

People: No. 1 Factor

Sir:
We would like to obtain about three extra copies of the article which appeared in the Aug. 20 issue concerning "People: Plant Building's No. 1 Factor" on p. 67.

D. W. HOYE
Asst. Superintendent
Electro Metallurgical Co.
Marietta, Ohio

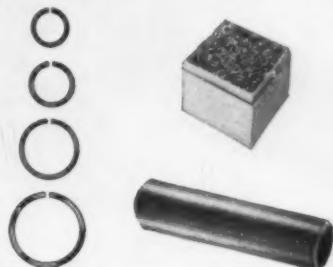
Weight Variations

Sir:
If tear sheets are available of the article titled "What About Weight Variations in Carloads of Scrap?" by Messrs. Passer and Bettman of the David I. Joseph Co. which appeared in the July 23 issue, we would appreciate receiving a dozen or so.

J. DRAGON
Goldsmith Bros. Smelting & Refining Co.
Chicago, Ill.



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CORPORATION OF AMERICA 
PHILADELPHIA 34, PENNSYLVANIA

Fatigue Cracks

by William M. Coffey

A Reckoning Cometh

To the not inconsiderable bill that one day soon we are presenting to Editor Tom Campbell we are adding the following:

One pair of new heels—\$1.75

One pair of garters—\$1.25

Five new pairs of socks, long
—\$7.50

One hat—\$8.76

Three new neckties, conservative—\$15.67 (conservatives come high)

One new razor blade—\$.10

That totals \$35.06. It results from Tom's editorial in this issue that we urge you to skip unless, of course, you want to be hooked for the same charges. It's another in his series of "how to get ahead" and is all about dressing conservatively, looking the part of the subordinate and all that. It takes second place only to another of Tom's costly editorials, "The Happy Gambler," which encouraged installment buying and cost us \$357.26 for a new washing machine and breakfast nook. Pretty expensive working around here.

In our own little way, however, we are striking back. We're writing this on a Saturday and the office is pretty lonely. We're wearing purple trousers, no socks at all, a blue denim jacket with "The Skulls" in gold on the back and a Betty Grable tie that lights up.

Technology

...with a twist. Good old Tom Rohan, our West Coast man, sends us this item from The AeROHR-crafter, the Rohr Aircraft house organ. A young woman visited Rohr some time ago and later was telling some of her friends how power packages are made. We think you'll find her description tres interesting:

"You cut up a lot of pieces of tin and hold them under a big gadget that falls down on them and bends them into all sorts of shapes. They make a lot of noise and are run by muscular men who yell and go around in dirty undershirts. Then they take these bent things and wrap them around a frame and punch holes with things that buzz and shake like everything. As soon as these hole punchers turn their backs

along come a lot of other people and fill up the holes with nails or something, and then everybody gets tired and goes on to something else. Then some other people take these big things off the frames and wire them onto the cutest engines you ever saw, then hook them onto an airplane, and you ought to see them fly."

Letters

Received this letter the other day:
Gentlemen:

This is the second time I have written to you requesting you to discontinue our copy of Newsweek. We will not pay for any further copies.

Puzzlers

The answer to the invoice and discount puzzler, September 24th issue, the third discount was 15%. The winners: Paul A. Tackett, A. J. Ferro, Jr., O. R. Garrett, J. S. Prifogle, Irma Gibbs, E. H. Fuller, Charles D. Gold, W. B. Lobbenberg, Norman H. Ferguson, Alex McWilliam, Clyde R. Weihe, David Kammen, Leon Mack, P. L. Lester, Sumner Moultrie, George A. Putnam, Todd H. Jones, Edward Harrison, R. B. Radcliffe, Roger Pailson, W. V. Platt, R. Rattner, H. L. Simms, Jack Nathan, Stuart Mason, Francis Keyser, W. K. Jacobs, B. L. Hutchinson, W. H. Harrel and Mr. Rice. A real jackpot on this one.

New Puzzler

Here's a tougher one: Four men named Brown, Jones, White and Smith went into a drug store and bought a Flibbet, a Smooch, a Paladine and a Brap, but not respectively. When they went into the store each man had less than a dollar.

1. Braps cost $\frac{1}{2}$ more than Paladines.

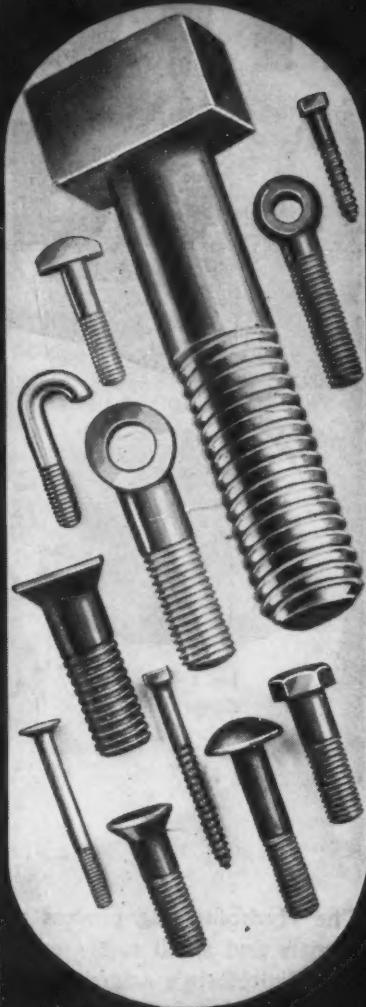
2. The man who bought the Flibbet had all his money in dimes and pennies, both before and after making his purchase. When he came out of the store he had as many pennies as he had dimes when he went in, and vice versa.

3. Brown spent 7 times what White did and Jones 8 times what Smith did. What did each man buy, and how much did each spend? Many thanks to Mr. Robert Hill for this one.

THREADED SPECIALTIES

TEE BOLTS

by an exclusive method



Among Pawtucket's many specialty products, these lower-cost tee-head bolts are the leaders in this field. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard.

Pawtucket tee-head bolts are made in standard sizes $\frac{1}{4}$ " and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

BETTER BOLTS SINCE 1882

PAWTUCKET

"THE BOLT MAN"
MANUFACTURING COMPANY
327 Pine Street, Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T. M. REG.

Flange radius control...another Hydroforming advantage!



Fig. 1
Flange radius
before edging.



Fig. 2
Flange radius
after edging.



Fig. 3
Partially drawn part after first
operation, is shown seated on
punch used for second operation.
Note large radius on part which
matches angular top of projection
on punch.



Fig. 4
Special cover
is completed
in second
operation.

The Hydroforming process makes possible sharp corners and small radii—without restriking. With the Hydroform's *edging feature*, a sharp flange radius can be produced automatically during the forming cycle.

Edging is accomplished at the end of the forming stroke by reversing the punch a short distance while the blankholding pressure remains on the part. The material formed to the punch moves downward with the punch. The flange of the deep drawn part rests on the draw ring and cannot move. Thus the flange radius is reduced as the punch is reversed. (See Figs. 1 and 2.)

By properly controlling the forming pressure in the latter stages of the draw cycle, it is possible (depending on type and thickness of material) to produce the required flange radius without edging. It is also

possible to produce abnormally large radii—advantageous in forming some parts requiring more than one operation without thinout. For example:

To form the special cover (Figs. 3 and 4), the blank was first drawn until the spout-like projection was reached and, by accurate pressure control, the large flange radius was produced which matched the angular top of the projection. Thus, with the material in proper position, the cover was readily completed in the second drawing operation.

Are you fully informed on all the advantages of Hydroforming? Let a Cincinnati Milling field engineer give you full details on this newest method for reducing costs on deep drawn parts production. For a description of the five sizes of Hydroform machines — 12", 19", 23", 26" and 32" — write for your copy of Bulletin M-1759-2.



Hydroform

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.



THE IRON AGE Newsfront

NEWSFRONT —

NEWSFRONT —

NEWSFRONT —

NEWSFRONT —

LOOK FOR MAJOR AUTOMAKERS to ease into the hot rod sports car field with special high powered packages. One manufacturer is already offering a heavy duty kit of dual carburetion and manifolding, dual exhausts, mechanical valve lifters, other speed producing elements.

TITANIUM may be used with some metals without harmful galvanic effect, some recent studies show. Example is its use in contact with 18-8 stainless steel in 50 to 60 pct nitric acid at 90° C. Neither metal is affected galvanically.

FREIGHT AND MINE CAR BUILDERS expect to do more strain gage testing to get a better picture of impact stress resulting from coupling. Designers believe electronic testing under yard conditions should result in new designs for carriage, truck and coupler.

GOOD MARKET FOR NEW CARS IN 1954 is expected by most automakers. For some producers, sales during August were excellent. A possible reduction of 10 to 15 pct in volume for the industry in 1954 seems to be the consensus around Detroit.

HIGH HEAT ABSORPTION AND SOUNDPROOFING qualities are combined in a new building brick recently developed. Testing of the brick, reportedly for use with a jet engine test chamber, was completed last week.

MILL PLATE LOOKS SOLID FOR FOURTH QUARTER and probably into the first. Heavy users still want more. Smaller consumers are still buying very heavily from warehouses, figure they'll have to do so until at least mid first quarter.

A WATER SOLUBLE OIL for use as a light machining compound for cast iron has been developed. Its makers claim it to be as good as dry machining, and without a ventilating system.

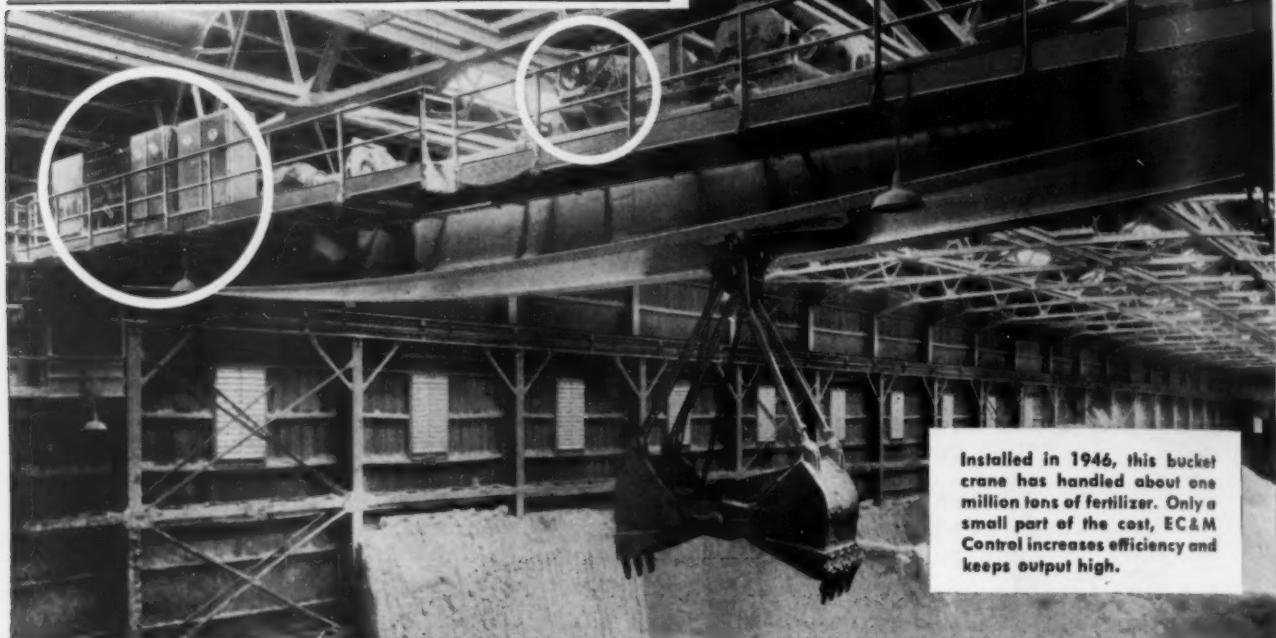
NAVY DECISION on who builds its new supercarrier is believed to have narrowed down to three firms. Bids are out but the award will not be made until after Jan. 7. Chances the vessel will be atomic powered are considered slim.

LONGER DRILL LIFE AND LESS DOWN TIME in a production drilling operation have resulted from use of retractable drill bushings. Bushings are removed after first drilling pass and the remainder of the hole drilled without a bushing. Drill breakage has been practically eliminated because of improved chip clearance.

BORON STEELS HAVE BETTER MACHINABILITY than equivalent standard steels, recently completed study shows. Six standard alloy steels and seven equivalent boron grades were compared. Difference in machinability is usually more pronounced where cutting is done with high speed steels than with carbides.

THERMOCOUPLES LAST LONGER in some high temperature installations where they are protected by a single metal-ceramic wall. Response to temperature fluctuations is more rapid than was possible with a double wall all metal well. The metal-ceramic has 77 pct chromium, 23 pct aluminum oxide by weight.

EC&M control and brakes show LOW UPKEEP on A-c bucket crane



Installed in 1946, this bucket crane has handled about one million tons of fertilizer. Only a small part of the cost, EC&M Control increases efficiency and keeps output high.

**RENEWAL PART Cost only \$1.40 per 1,000 tons of fertilizer
handled during 7 years of operation.**

Sounds good and is good—but read the complete story of how EC&M Control Apparatus has given almost perfect service...operating 12 hours a day throughout nearly 7 years on this A-c bucket crane in an eastern fertilizer plant. EC&M Controllers and Type WB Brakes have required few replacement parts. Maintenance has been on a routine basis during normal idle periods. EC&M Type WB Brakes and EC&M Frequency Relay Control have operated with *no production delay in 7 years*.

This is typical of the performance of EC&M Control Apparatus on every type of material-handling crane. Cab-operated or floor-operated; a-c or d-c motored. Before buying cranes, contact our nearby office for recommendation on control that will promote high-speed production at low upkeep. It pays to specify EC&M Control for cranes.

NEVER HAD IT SO GOOD!

**EC&M LINE-ARC
Contactors are known
for low upkeep**



1. No destructive arc shield burning in 7 years—only 3 broken shields replaced.
2. 14 contactor coils have operated continuously with only one replacement.
3. Contacts renewed on an average of once a year on one size and once every two to three years on the other size. No replacements on largest size contactor.

EC&M WB Brakes solve the A-c Brake Problem*

1. Brakes relined on an average of every 18 months.
2. Not a single brake-coil failure.

*Fast-releasing—fast-setting—no chatter, hum or hammer.



THE ELECTRIC CONTROLLER & MFG. CO.
2698 EAST 79TH STREET • CLEVELAND 4, OHIO

STEEL: Scores High In "Readjustment" Test

Order cancellations past their peak . . . Inventory correction two-thirds completed . . . Market still sound . . . Drop in conversion and marginal operations—By J. B. Delaney.

Now that the hysteria over the shifting steel market has died down, steel producers and consumers with a realistic viewpoint have come up with these conclusions:

► The steel market is fundamentally sound.

► Order cancellations, while still sizable, have passed their peak and are tapering off.

► Consumer inventory correction, largely responsible for the softer tone of the market in recent weeks, is about two-thirds accomplished, should be completed by year's end.

► Freight absorption and price adjustments brought about by more competitive conditions represent considerable concessions in terms of dollars but do not represent a fundamental weakness in the steel price structure.

► The slight drop in the steel ingot rate, while indicative of a decline in demand, is nothing to be alarmed about. At least part of the drop represents taking out of marginal facilities that can be operated profitably only in time of abnormal demand when desperate consumers are willing to pay the price. Some of the drop was due to disappearance of the high-cost conversion market.

Only Premiums Fall

Base price changes to date have involved premium prices—prevailing market prices remain unchanged.

As long as the ingot rate remains in the nineties, freight absorption will be on a relatively limited basis. The mills can still afford to make their own decisions on which products and to what consumer points they will absorb

freight to meet steel competition.

Freight absorption could reduce steel costs of individual consumers as much as several million dollars per year. In fact, one large fabricator has estimated the full potential of freight absorption for his company in those terms. Savings to date are running nowhere near that due to the spotty nature of absorption and continued high demand for most steel products.

Find Transition Palatable

The basic price structure of the industry shows no signs of weakening despite reductions by mills that had been getting premium prices for some products. This was

inevitable as supply and demand came into balance on these products and consumers found they could get what they needed at regular mill prices.

The competitive situation in steel apparently has alarmed everybody but steel producers. A check with on-the-firing-line sales people indicates that while the producers are not prone to shrug off the change from a steel-at-any-price market to one of increasing competition, they feel that the period of transition has been anything but painful. As one executive voiced it, "I think the inventory correction we are living through has been quite palatable to the steel industry generally . . . I think it presages a more healthy and more realistic market once steel inventories have been reduced to more normal levels."

In support of this viewpoint is

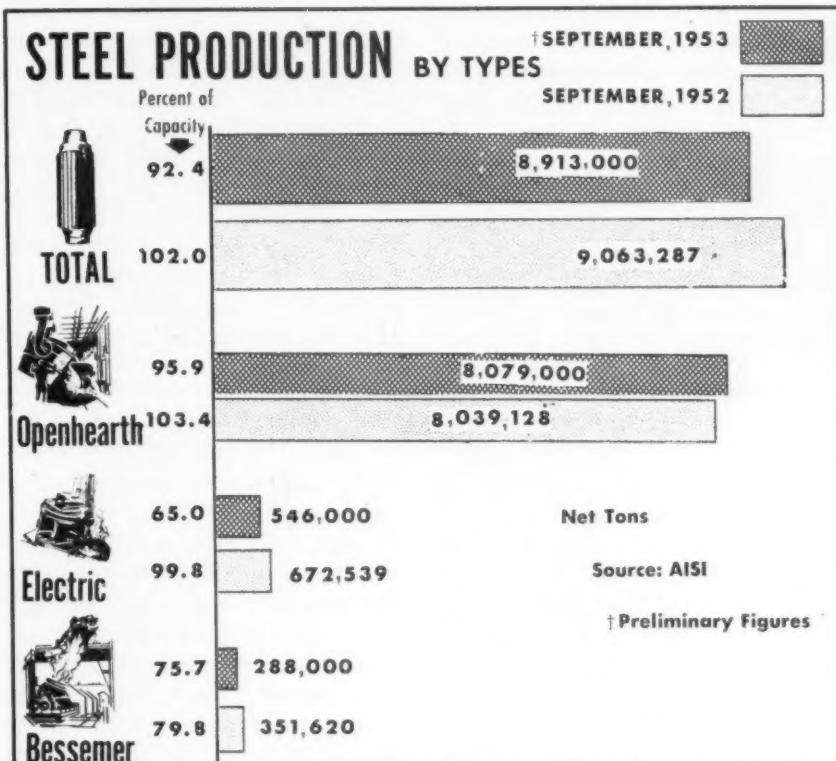


PLATE: See Carryovers into 1954

General easing of steel products hasn't hit plates . . . Demand from some users is still terrific . . . PA's expect some easing to come in first quarter—By K. W. Bennett.

While major interest has been centered on changes in the steel market — notably easing of most products—a few items have remained almost as scarce as ever. Among these are oil country goods, structurals, and plates.

Last week the steel plate situation looked especially dire. Several mills had begun recently to talk of a plate carryover from fourth quarter into first quarter next year. Purchasing agents were still buying premium-priced plate. Odd lots of small tonnage and off sizes were being fought over by purchasing agents.

Easing Signs Slow

It appeared that plate and structural steel would be hard-to-get items through first quarter of next year. And suggested allotments offered by one plate producer were no better for first quarter than they are in fourth quarter.

But a close examination of the scene indicates that a little silver is beginning to shine through the clouds. Warehouse pressure for plates seems to have dropped somewhat. Warehouse inventories are nearing a comfortable level and plate is one of the commodities that's begun to show some relief. At the same time, reports from the construction equipment, farm equipment, and industrial truck fields indicated that their plate levels are more satisfactory.

Special Report

Continued

the forecast of a large manufacturing company that its 1954 steel requirements will be slightly higher than in 1953. This company is now negotiating with steel producers on 1954 needs. Bulk of the increase will be in form of sheets and strip, with one new plant alone accounting for a boost of between 40,000 and 50,000 tons of flat-rolled in '54, perhaps 100,000

In at least one case a heavy plate consumer actually cancelled plate tonnages, is slowing up on his buying until at least January of next year because current lower demand for his products makes his inventory high. Anybody after those cancelled tonnages will arrive too late. They were snapped up by eager customers in other lines.

But the cancellations were early indicators. One mill had a little plate space open for December—not much, but some. Another mill that had expected a carryover said that it might have some extra plate space in early January.

Coupled with this is the fact that heavy plate consumers are getting by on nearby plate. Premium-price plate brought in on a long freight haul is out. Large plate consumers are buying in their normal purchasing area, even though they would like to have more mill steel than they can find in their historic buying area.

Where Demand Is High

The smaller consumer who normally buys from a mill is buying from a local warehouse what he can't get from a local mill. Out-of-area steel is still being purchased but the quantities are shrinking to spot purchases.

That was the bright side of the picture. It indicated that there might be some extra mill plate available by February, and probably

tons more per year when full output is achieved. Requirements for structurals, plates, and bars will be about the same as in 1953.

Another stabilizing influence in the current market is the hesitancy of many consumers to risk loss of dependable steel suppliers by pressuring for freight absorption by more distant mills. They realize that sudden domestic or

earlier in both wide plate and heavy plate over 1-in. thickness.

Steel mill men aren't anxious to make any promises. Here's why: Steel for fabrication in petrochemical plants, petroleum plants and pipelines, and for liquified petroleum gas use, notably plate ranging from $\frac{1}{4}$ in. to as high as 1 in. is in strong demand.

Consumers in this category state frankly that they are starved for mill plate and haven't been able to get promises of relief during first quarter. They'll state that if their plate picture looks healthier for first quarter, it's because they are receiving fewer inquiries for work in that quarter.

Want Mill Plate

Another reservoir of demand remains untapped. The small plate consumer who's been working on a pint-sized quota of mill steel, is still trying to get back into the act. He's not happy with his current inventory which is moderate to good, but contains too much premium-priced steel. And he's still paying premium prices for steel in spot quantities.

But he's raring to get back onto a full mill diet, and he hopes to be able to do so before the end of first quarter.

The purchasing agent who is out hunting down steel plate hasn't been given any pie-in-the-sky promises for first quarter. On the other hand, he has a growing hunch that when February comes, he'll be able to pull more carbon plate from the mills. In a few cases, he believes that he'll be able to get everything he wants but adds that he will not be using as much plate in first quarter as in fourth.

international changes could transform a complacent steel market overnight into another nightmare of stringent supply.

Some consumers have already had cause to regret hasty cancellations and requests for hold up of orders. They have had to go back to the mill to ask for reinstatement on the order books (*THE IRON AGE*, Oct. 15, 1953, p. 153).

MAGNETS: Attract Many New Markets

Demand for permanent magnets has soared to \$30 million a year . . . New markets coming thick and fast . . . Carboloy opens new plant, aims at 30 pct of market—By R. D. Raddant.

Modern industry is creating its own magnetic field.

Since the development of the alloy permanent magnet in the 1930's, the field has grown from a tiny handful of industrial electric and novelty applications to literally thousands of uses in all segments of industry and homelife.

The tremendous growth of the magnet market, now rated at about \$30 million a year, is only getting started. Its potential was dramatized this month with the full dress entry of the giant General Electric Co. through its Carboloy Dept. into this formerly tiny business.

Will Expand Market

The new Carboloy plant is just getting into production at the little upstate town of Edmore, Mich. Here the impact of a large corporation's expansion is still being felt, even though by industrial standards the plant's employment of about 400 persons isn't large.

GE has been making magnets for some time and holds the basic patterns on Alnico magnets. Until recently, most of the production was for GE's own use and the

corporation still absorbs about 40 pct of Carboloy's magnet production. Carboloy intends to reduce this figure, but by expanding its market.

Leading producers are Crucible Steel Co., Allegheny Ludlum Steel Co. and Indiana Steel Products Co., in that order. These three companies produce about 80 pct of the total market. Carboloy intends to improve its own position from fourth place to the point in 2 years when it expects to have grabbed 30 pct of the market.

At present, 80 pct of U. S. magnet production goes to the military for radar, radio and electronic applications. Restrictions on nickel and cobalt, principal magnet ingredients, since Korea have prevented the expansion into civilian markets.

New Fields Open

But this market now appears to be ready to move, with such recent developments as color television, industrial magnetic separation, meters, instruments, metal fastening and locking devices just beginning to open up.

Right now industrial separation is in third place in taking up magnet output, but is probably the fastest growing market. New taconite mills now under construction are going to use magnetic pulleys and, as one official put it, "A single pulley means more than a ton of Alnico."

With the increased use of control equipment another major use of magnets is coming into prominence. Communications provide another big magnetic market. It is now predicted that magnets will be used to hold metal together, to create refrigerator locks, and even to replace the zipper on clothing.

In jumping into this fast growing commercial field, Carboloy has

constructed its magnet plant at Edmore, a town with a population of 8000.

In spite of the small size of the town, Carboloy had about 3500 applications from the surrounding area for its 365 jobs.

At Carboloy, eight grades of permanent magnets are made, Alnico 1, 2, 3, 4, 5, 7 and 12, each composed of a different combination of elements. In full production, more than 2200 different sizes and shapes will be turned out. Magnets are fabricated by two methods, casting and powder metallurgy.

Sintered magnets, produced by powder metallurgy, are more easily adapted to mass production of small magnets with intricate shape. Cast magnets are made by two methods, the jolt-rollover method and by core blowing.

Pressed Like Pills

Because of the difficulty of machining and grinding the finished magnet, shell molding is a logical method of magnet casting and is being done experimentally at the foundry.

Pill presses similar in design to those employed in the pharmaceutical industry form the compacts for sintered magnet production. Presses can produce about 1700 compacts per hour, or about 27,000 pieces a day.



AFTER heat treatment, aging, magnets are run through a demagnetizer (left).



FOLLOWING demagnetization, magnets are sand-blasted prior to finish grinding.



THE GRAND PALAIS, site of the Fortieth Paris Auto Show, was resplendent with the latest in flashy car styles.



PLASTIC BODY of this French Dyna Reac weighs about 79 lb without the detachable cockpit cover. Built in Morocco, it's won several races in North Africa.



DESERT DRIVING is the purpose for which this French VDB was designed. It'll do about 29 miles per gallon.

Paris Views World's Autos

Want a 23½-ft convertible with seats converting to sleepers and a built-in bar and ice box? No? Well, you could have seen Arabian King Ibn Saud's at the Paris Automobile Show early this month. According to one source, this car took 8000 hours to build and cost the King some \$2.8 million.

Other displays by the 120 auto manufacturers from eight countries were only a bit more modest. The plastic-bodied 104 mph French-made Dyna Reac carries a price tag of only \$213,200.

Styles were gay and modernistic enough to draw gasps of delight from even the most sophisticated Parisian viewers. Take a look at some of these.



V-8 POWERED Fiat, body by Ghia, is made in Italy.



GERMAN-built Borgward uses six-cylinder engine.



SPORTSTER is British six-cylinder Aston Martin.



149 MPH is claimed for this 250-hp Spanish Pegaso.

CHINA: Reds Push Industry Build-Up

Red regime is doing a bootstraps operation on under-developed Chinese industry . . . Communist Trade Fair gave some glimpses behind Bamboo Curtain . . . Outline expansion.

Technically primitive Red China is now striving to bridge centuries of backwardness by beginning a fast climb toward industrialization. At stake for the Peiping regime is its future security as a government capable of assuring its people a rising standard of living and the industrial potential of a modern nation. Meanwhile, the western world will be threatened by a further build-up of the Soviet bloc.

Copy Russian Tools

For a glimpse behind the Bamboo Curtain IRON AGE went to the recent Communist Trade Fair at Leipzig, East Germany, where prideful Chinese had shipped hundreds of tons of machinery 7000 miles to display first fruits of their industrialization drive.

IRON AGE correspondents reported Red China's program as substantial but still in its initial phase with immense obstacles remaining. Although outdated, a score of machine tools showed a marked improvement over those displayed last year. East German engineers, after a 5-month evaluation tour of Red China's industry, commented that designs were borrowed freely from American, British and German tools, but the trend today is to copy Russian equipment.

Work on Steel Mill

There were other gleanings of industry in Red China:

Crude steel output for 1953 is expected to approach 3 million tons, almost double the 1943 peak, while coal is just regaining the 1944 level of 25 million tons. Coking coal is being conserved by heavier use of oil, low-grade coal and hydro power. It's reported that sintering of inferior iron ore for pig iron has begun.

Manchuria is the scene of

greatest activity. At Anshan the Japanese-built integrated steelworks, largely destroyed in the war and partly dismantled by the Russians, is being rapidly rebuilt. The first automatic blast furnace was lit in March. A second is under way.

Openhearts and blooming mill are being renovated. Three rolling mills are under construction. A new seamless tube mill is now under test and a rail and structural rolling mill is to be completed next month.

Construction is reportedly proceeding on a continuous mill for thin (under 0.35 mm) sheet. Foundry and machine tool plant are being expanded.

Mechanize a Coal Mine

Anshan's population of 400,000—already double the 1949 figure—is expected to grow further with the planned tripling of the iron and steel combine by 1957.

At China's principal coal center of Fushun, 75 miles northeast of Anshan, one open-pit mine has been mechanized, a number of shafts opened up. Local producers of mining machinery and heavy electrical equipment are being built up and the large petroleum refinery is being restored.

Expansion at nearby Mukden includes heavy machine tools, large turbo-generators, ball bearings and pneumatic tools. Over 100 factories are now operating at Harbin with construction priorities going to machine tool, precision instrument and electrical equipment plants.

No. 2 industrial area is Taiyuan in Shansi province. Modernization of the steel works there includes an electric furnace and a strip mill. Newest products are said to be chrome stainless and silicon sheets.

Machinery is going into an-

other plant for making coke ovens, rolling mills and large travelling cranes, according to one report. Taiyuan also boasts a new textile machinery plant nearing completion.

The Tientsin steel mill is understood to be making rod, bar and shapes, and a machine tool plant started up last winter.

Produce Bessemer Steel

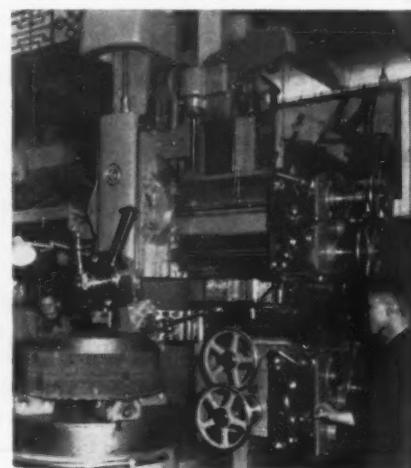
At Tangshan, 90 miles east of Peking, it's said that basic Bessemer steel for plates and rails is being made. Peking itself is turning out machine tools, cement mixers, farm machinery, surveying equipment and printing machinery.

Production at Shanghai, center of China's light industry, has been expanded to include machine tools, construction and quarrying equipment, electrical cables, Diesel engines, railway wheels and couplings, structurals, tool and rimmed steels and Alnico. Pig iron is smelted from local ore at nearby Mannshan.

An integrated steel works is being renovated at Hankow, now the hub of central China's industry linked by river or rail with the Pinghsiang coal mines and Tayeh ore and metallurgical center.

Extend Rail Links

In the southwest, machine tools, generators and transformers are made in Kunming and a Chungking factory specializes in gear hobbers. Chengtu, now connected



Chinese technician demonstrates vertical boring mill at Leipzig Trade Fair.



TODAY'S GREATEST CRANE VALUE... Series "D" *'Load Lifter'* Cranes

ADVANTAGES of the most expensive cranes are engineered into the new Series "D" 'Load Lifter' Overhead Electric Traveling Cranes built by Shaw-Box. They are priced far lower than other makes designed for average industrial service, because Shaw-Box employs standardization and mass production techniques to the fullest extent.

SERIES "D" 'LOAD LIFTER' CRANES are ruggedly built in three basic types and three styles of trolleys. Capacities range from 1 to 20 tons. Three-girder bridge construction assures freedom from whipping and skewing. All gearing operates in oil in sealed housings. For maximum efficiency, every bearing is a ball or roller bearing. The bridge and trolley wheels are carried on axles that rotate on anti-friction bearings. On floor-controlled cranes a pendant-type push-button assembly is provided to actuate variable speed magnetic controllers. Cage-controlled cranes are operated by master switches. You can be certain of accurate, easy control, complete safety, low maintenance, economical operation and dependable service.

SELECTION IS EASY because every Series "D" 'Load Lifter' Crane is cataloged by size and type. Write for Catalog 221 and choose the crane that meets your requirements exactly.

'Load Lifter' CRANES



MANNING, MAXWELL & MOORE, INC. Muskegon, Michigan
Builders of "Shaw-Box" and 'Load Lifter' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments, and Aircraft Products.

International

by rail to Chungking, has several engineering plants and a railway workshop under construction.

Industry is also progressing in remote Singkiang province in the northwest, with power plants and machinery factories going up and a steel mill operating in Tihwa. Rail line from the coast has been extended to Lanchow. There are plans to extend it 2000 miles inland through Yumen to Tihwa and then to link it with the Russian line in central Asia.

Extensive prospecting has been reported in this area, the Chinese claiming to have discovered rich deposits of coal, iron, copper, manganese, tungsten, zinc, beryllium and bismuth in Kansu and Shensi provinces.

Need Trained Men

Estimates of oil reserves in Yumen have increased with stepped-up drilling and extraction. Geological surveys in the east are said to have uncovered new deposits of coal, iron, tin, lead and other metals.

Although many Chinese have been trained in Russia, skilled manpower lags far behind China's industrial ambitions. But East Germany is now also training Chinese. And China is stepping up technical training at home.

Metallurgy schools at Anshan are intended to turn out 35,000 technicians and workers in the next 5 years. Similar facilities are being set up in Chungking. And in other industrial centers top priority has gone to mechanical and civil engineering, geology, communications and mining.





WEAPONS: Slay Them with Quality

Army's arsenal gaining more accuracy, firepower . . . Aberdeen shows off variety of weapons . . . Unveil tank retriever . . . Parade Russian vehicles and tanks—By W. G. Patton.

If Uncle Sam can't overwhelm his enemies with sheer mass of manpower he will surely lay them low with the quality of his weapons. That the army's arsenal was gaining more accuracy, fire power and mobility was convincingly and loudly demonstrated last week at Aberdeen Proving Ground, Maryland.

Tested before 5000 members of the Army Ordnance Assn. were such varied items as body armor, new mortars, recoilless rifles, anti-aircraft guns, rockets, new automotive equipment, the 280mm atomic cannon. Also demonstrated by Army Ordnance were winterization of equipment, remote control of tanks and planes, tank recovery and tank firing.

Battle-Tried Weapons

Conspicuously absent from the display were guided missiles and other weapons and equipment known to be well along in the development stage but which are being kept under wraps. Ordnance showed a strong hand at Aberdeen last week—but definitely not its strongest.

While many of the weapons and vehicles displayed have been battle-tried in Korea, they were new to many of the visitors. Actual unveilings were limited to a new

tank retriever and a "turret-on-a-turret" design for future tanks.

Most impressive new member of the tank family is a giant tank retriever called the T-51 shown above. It can lift up to 30 tons with its giant crane. The new turret-on-turret allows the tank commander to operate from the tank turret without being exposed to shell fire.

Weather-Proof Gun

Guests of the Army Ordnance were shown tank repairs being made in minutes and a new coupling that permits crippled tanks to be picked up without exposing personnel to gunfire.

A submachine gun was exposed to rain, mud and dust, yet functioned perfectly. The army now has body armor made of aluminum plate backed by nylon that offers successful protection against fragmentation.

A new 50 caliber machine gun, the M3, fires 100 shots in 5 seconds. Much faster than the M2, it increases fire power of our fighting aircraft by 50 pct. Six of these guns may be mounted on a single jet fighter.

There is much emphasis by Ordnance on weight reduction which explains the use of a titanium baseplate on the new 81mm mortar. The new weapon is effective

up to 800 yards and represents a weight saving of 50 pct over previous models. The Army now has shown mortars up to 155mm, having a range up to 6000 yards.

Antiaircraft Foursome

Weight is being taken out of recoilless rifles so the foot-soldier can carry these weapons. Titanium may eventually play an important part in their construction.

A new antiaircraft weapon consisting of four 50 caliber machine guns was shown. It's to be the nemesis of low flying aircraft.

Latest antiaircraft equipment is the 75mm Skysweeper equipped with radar and on-carriage fire control equipment. This gun has exceptionally fast tracking and a high rate of fire. There were also firing demonstrations of the 90mm and 120mm antiaircraft guns. Both of these weapons have off-carriage fire control.

Tanks on Target

Russian-built vehicles were paraded before the group, including a number of trucks and tanks. While Russian engine designs appear to be carbon copies of outmoded U. S. engines, the vehicles are well made and perform satisfactorily, according to informed Army sources.

Tank firing was highly impressive. Guns ranging from 76mm on the Walker Bulldog tank to the 90mm gun on the M48 scored better than 95 pct hits on both still and moving targets up to 2100 yards.

Mobility and fire power of the 280mm gun is such that this unorthodox two-carrier vehicle with twin cab controls can negotiate most highways and bridges. With controls at each end, the gun and its carriers can negotiate most highways and bridges. It can travel on the open highway at more than 35 miles an hour. The 85-ton gun traveled under its own power over a section of Bailey Bridge. A large indicator showed that deflection of the bridge was well within permissible limits.

ANNUAL WAGE: Can't Be Guaranteed

Chamber of Commerce says a guaranteed wage is impossible without production guarantee . . . Made little progress . . . Most agreements full of loopholes . . . What are effects?

Just how practicable is the guaranteed annual wage in our constantly changing free enterprise economy? Can industry actually guarantee the worker a set minimum annual wage? This amounts to assuring him a set number of working hours each year—to meet a certain volume of production which somehow must find enough of a market come what may.

Makes Little Progress

Chamber of Commerce of the United States, airing its views in a recent booklet, points out that guaranteeing wages is impossible unless you can guarantee production levels beforehand. Despite union arguments claiming it will insure purchasing power, other factors militate against the guaranteed annual wage. Altering the tempo of output and thus working time are shifts in consumer demand recessions, seasonal influences, new products or techniques, war production, etc.

Plans vary widely and arguments on the definition of the term are frequent. Some consider the guaranteed annual wage as an extension of unemployment compensation. Union definition seems to be the private guarantee of full take-home wages on a year-round basis.

Refutes Arguments

In its pure state the guaranteed annual wage has made virtually no progress in this country. Union-management agreements of this type are riddled with loopholes which recognize the economic facts of life. Of 2600 agreements studied in 1952, only 184 had some sort of guarantee. Only 20 guaranteed wages for a substantial part of the year. The rest merely guaranteed a certain number of hours or pay for each week.

Making no headway in pushing guaranteed annual wage plans into

industry, unions are changing their tactics. Present plan is to tie state unemployment compensation and guaranteed annual wage together.

But reducing the direct cost of guaranteed wages by paying it as unemployment compensation still leaves the bill, with another name, for industry to pay.

Unions have argued that placing the financial burden of unemployment on management will force employers to solve the layoff problem. The booklet questions the reasoning behind this, pointing out that some things are beyond the ability of management and cites earlier union arguments for federal unemployment compensation to show that unions are aware of this.

Countering the union theory

Guaranteed by What?

Said the Geo. A. Hormel Co. on the guaranteed annual wage:

"Certainly our company is wholly unable to redeem the money consideration in such a guarantee unless we can keep our people actually and profitably employed. The entire asset value of our company, cashing everything we own, would only be sufficient to redeem a 10 months' guarantee. If we as a company cannot make such a guarantee, neither can our community, for we know that in our town all of the bank assets including county deposits, city deposits, all the money owned by all of us, would only cover the payroll for 9 months. So, when using the phrase 'guaranteed annual wage,' we must ask the question—guaranteed by what? The only guarantee we know of is the ability of management to manage, coupled with willingness of workers to work. If either fails, then the guarantee fails."

that jobs make payrolls which make markets, are the many other factors causing business cycles. All income is not spent for current consumption, and the rate of capital investment varies. Human psychology, fluctuations in credit and interest, advances in technology are some of the others.

Variations of guaranteed wage plans are in force abroad. How have they worked? Many American firms operating in Latin America are forced to retard job-making investment. Some invest only enough to satisfy low demand and rely on other sources for filling periods of high demand.

Cuts Incentive

Another effect would be the loss of incentive to work. This has been noted in present unemployment compensation plans and any extension through a guaranteed wage would also extend this.

Highly pertinent is the question of whether a company or industry can give any substantial guarantee of wages. The accompanying box indicates the absolute extent to which one firm could go.

Even during periods of general prosperity employment can vary widely between different industries: For instance: During the mild readjustment of 1949 the steel industry's operating rate declined from over 100 pct to 66.1 pct in a brief period when disposable income showed only a slight decline. Fluctuations among individual producers were much wider.

Give Labor a Say

One of the fears expressed by the Chamber of Commerce is that adoption of a guaranteed annual wage could eventually lead to cartelization, thence to codetermination of industry policy by labor and management. It would come under the guise of a stabilization policy to assure steady jobs.

The booklet foresees union authority then extending as far as equality with management in the determination of prices, production, capital investment, rate and nature of technological change, and the size and location of plants.

UNIONS: Feel Out New NLRB Members

Labor is watching closely every move made by the new NLRB . . . Some opinions formed . . . Plan campaign for Taft-Hartley changes . . . Seek guaranteed wage—By R. M. Stroupe.

Organized labor, now sharpening its arguments for congressional revision of the Taft-Hartley Act, is keeping a wary eye on the composition of the agency empowered to administer the law—the National Labor Relations Board.

As of last week, the board was operating with only four of its quota of five members. Some union officials, though, believe they have seen enough to formulate a few opinions as to its attitudes, its judgment of its task, and its probable performance.

One labor contention is that in a given case requiring an NLRB ruling the board probably will show an inclination to take the part of management. This does not indicate, however, that labor believes the pre-1953 board favored the unions.

Wants Employee Views

Management view is that the board has handed down too few decisions to indicate favoritism for either side.

Union officials believe NLRB chairman Guy Farmer will demand, in any bargaining controversy, more than a show of cards indicating that the majority of employees in a company are willing to have a union negotiate for them. It's probable, they think, that Mr. Farmer—and possibly other members—will not require an employer to bargain with a union unless an election has proved the will of the employees.

Second point in the labor estimate: The new board will exercise the discretion available to it in interpreting the law. One union complaint about the pre-Eisenhower panel was that it insisted upon a highly technical construction of the legal terms.

It seemed to some representatives of management that the board in Truman days did not adhere

closely enough to the will of Congress as expressed in Taft-Hartley terms.

May Yield Hint

On a third point, involving the well-seasoned argument over the formation of unions on the basis of industries or crafts, the Congress of Industrial Organizations believes it sees signs that NLRB is looking more kindly on industry-wide organizing. No ruling by the new board either supports or contradicts this surmise, but a decision that is being awaited may give some interesting clues.

That decision involves the attempt by three American Federation of Labor unions to organize certain employee groups already represented by a union in the American Potash and Chemical Corp. plant, Trona, Calif. (See THE



"All those in favor of 15¢ an hour for the union say 'aye'."

IRON AGE, Oct. 15, p. 75.) In arguments on the case, the CIO, U. S. Chamber of Commerce, and National Assn. of Manufacturers found themselves allied, while AFL took the other side.

Law Will Get Blame

It may be some weeks before NLRB is ready with a ruling on this very thorny subject. When a decision is made, though, it is certain to be interpreted as a forecast of the board's actions regarding organizational squabbles in other industries.

Whatever NLRB does in a particular controversy, the probabilities are that those on the panel will make a serious effort to abide by the intent of Congress as conveyed in the law being administered. If there are labor disagreements—and there will be—with certain interpretations made by the board, these will renew the conviction of labor chieftains that the law itself needs changing.

This position was reiterated in a recent letter from the CIO to Sen. Irving M. Ives, R., N. Y., commanding the senator for urging that politics be eliminated entirely in considering proposed Taft-Hartley act changes. The message stated the CIO contention that President Eisenhower still must carry out a campaign pledge to provide "justice and fairness" in the labor law.

Act Not Perfect

One important official who finds provisions in Taft-Hartley as it now stands for "adequate and fair procedures" for both labor and management is chairman Farmer himself. He calls the act a "good law" and says that it, "if properly administered has a salutary effect on labor relations."

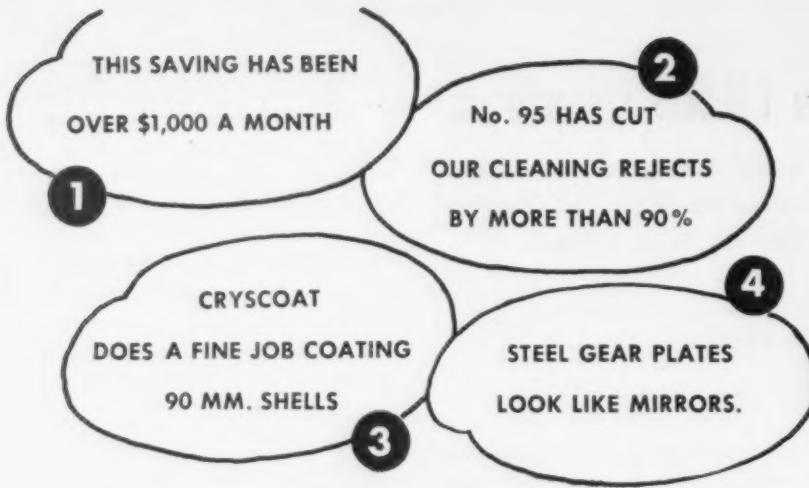
He does not say the act is perfect, but he is convinced its "basic structure" is sound. The job of his agency, as he sees it, is to insure that the rules are understood, while employers and unions work jointly to abide by them.

Seek Guaranteed Wage

While exploring the chances for Taft-Hartley revisions, top union men are readying a campaign for a strong bid to get a guaranteed annual wage provision in contracts signed next year. An important drive will be made to work the wage guarantee into new basic steel agreements.

Steelworkers' contracts expire on June 30. Union negotiators will point to layoffs in the industry as a heavy factor in demands.

On this score, a study made by the U. S. Chamber of Commerce states that there is no widespread acceptance by employers of the idea.



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Every day 200 Oakite Technical Service Representatives use Oakite cleaning materials and methods to help thousands of Oakite customers accomplish metal-cleaning jobs that are important parts of big production operations.

When a busy customer sends a few words of appreciation, we treasure those words as a *success sentence* that we have helped write in his *success story*.

Here are brief explanations of the *success sentences* quoted above:

- 1 After 6 months use of Oakite Special Protective Oil for preventing rusting, this manufacturer of precision steel parts estimated savings at more than \$6,000.
- 2 The use of Oakite Composition No. 95 for conditioning zinc-base die castings before plating cut cleaning rejects for this hardware manufacturer and showed other "very fine advantages."
- 3 Oakite CrysCoat HC put a heavy phosphate coating on 385,000 shells with "absolutely no trouble" according to a munitions maker, who added that "maintenance and control are very easy."
- 4 For burnishing, "Oakite Composition No. 3 is here to stay" says this maker of aircraft instrument parts, who adds "Pinions are polished to the roots of the gears. Magnesium parts are brilliant."

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Materials Handling

CONVEYORS: Roll

Truck mounted rollers link docks of nine Ford plants... Firm installing more.

Loading a truck with 30,000 lb of automotive parts in 10 minutes is no record at Ford Motor Co. It's typical of speeds made possible by Ford's materials handling system.

In effect, it's like a roller conveyor linking nine plants in the Detroit area. Result is a substantial trimming of unproductive time for trucks and fork lift trucks at loading and unloading docks where a large volume of parts must be handled.

Three elements comprise the system: (1) Docks have roller conveyor tracks sloping 2° in the appropriate direction and truck ramps are likewise angled to get the benefit of gravity, (2) truck and trailer beds mount conveyors matching those of the docks and (3) racks and bins are standardized with skids spaced to fit the conveyor rails.

When an empty truck rolls up to the dock, loaded racks are already waiting on the rails. Grav-



BACKED UP to ramp, conveyor in

From Dock to Truck



GRAVITY unloads racks of auto parts.

ity does the rest. Cargo shifting enroute is prevented by locking devices on the truck's conveyor rails. At the unloading end the process is reversed.

End sections of the dock rails are provided with several inches of vertical and lateral play to simplify the aligning of truck and dock roller tracks.

Does Ford like the system? Equipment is already mounted at 17 stations and 20 more in the Detroit area are being converted.



truck matches tracks on loading dock.

Ready for you after 12 months of brutal



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CLARK's New and Exclusive HYDRATORK DRIVE*

Here's how it improves your fork-truck operation:

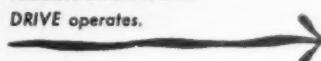
- 1 MORE WORK:** faster get-away, positive power without slippage; moves heavy loads and climbs ramps with ease.
- 2 LOWER COST:** higher percentage of "on-the-job" time results from no clutch problems, "cushioning" effect on motor and drive members.
- 3 GREATER SAFETY:** hydraulic brake system, linked to torque converter, automatically cuts power; engine cannot be started unless controls are in neutral.
- 4 IMPROVES DRIVER EFFICIENCY:** finger-tip direction control and elimination of gear-shifting conserves operator energy.

Not one, but *eighteen* HYDRATORK-equipped trucks were placed in customers' plants for a full year of on-the-job testing. Without exception, these units proved that reduction in driver fatigue and of truck downtime results in greater production from HYDRATORK-equipped trucks.



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exclusive HYDRATORK
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AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

SMALL FIRMS: New Agency Will Help

Small Business Administration aid program takes shape as regional offices open . . . Stress advisory services as equal of loans . . . Cooperate with banks—By W. H. Hillyer.

Government advice and financial assistance to small business are taking concrete form as Small Business Administration regional offices open across the country to replace the defunct RFC.

Typical of the national pattern of SBA is the New York regional office, under the direction of J. Frederick Benedict. This office will serve New York State and parts of New Jersey and Connecticut.

How It Works

Mr. Benedict told THE IRON AGE he feels SBA has much to offer metalworking firms, but stressed that the agency is ready to serve all independent businesses, regardless of type or location. Replies of Mr. Benedict and his aides to "how

Who Runs It?

Small Business Administration has so far named five regional directors to fill posts in the 13 regional offices it inherited from Small Defense Plants Administration.

New appointees include J. F. Benedict, owner of a New Jersey metal fabricating plant, to the New York office, and D. F. Entwistle, Daytona Beach, Fla., plastics fabricator, to the Atlanta office. Heading the Philadelphia office is W. H. Harman, former vice-president of Baldwin Locomotive, while C. P. Moore, Richmond, Va., restaurateur, will be in charge of the Richmond region. D. I. Williams, former vice-president and general sales manager, Ohio Match Co., will make his headquarters in Cleveland.

The other eight regional offices are now being run by SDPA appointees, who may not be replaced if SBA feels they are doing a good job and they want to stay on.

it works" questions melt down this way:

(1) SBA is not merely a lending agency. Its moderate initial hoard (\$55 million) is only one of many facilities designed to help the applicant help himself. Among these, specialized technical and production advice and help in bidding on procurement contracts are considered as important as finance.

Advice will be free and of top business caliber. Your firm may have unrealized potentials for credit and net earnings, which qualified experts would unearth.

See SBA First

(2) Acceptance of a loan by SBA hinges upon a private-lender turn-down, but this does not mean that you must begin by going to your bank. You might well go first to SBA for consultation before you formulate your proposal. The agency will check your books, suggest possible changes that would give you a truly bankable proposition.

On the other hand, SBA may decide that your needs cannot be met by a bank. In that case, the agency will help out by participating with a bank in carrying your loan, or by working out a long-term private credit in a "community capital pool" with local lending institutions. If these methods won't work, and your project still looks good, SBA may let you have the money out of its own funds.

Vague on Interest Rates

(3) "Long-term capital" is the starred commodity at SBA, with maturities ranging from 5 to 10 years in easy installments. Collateral security will vary with individual cases, always recognizing the fact that the earning power of the business itself will be the basic source of repayment.

(4) SBA officials are at present indefinite about interest rates.

There is small chance of "cheap" money in the FHA-VA sense, but a 6 pct base seems probable. Theory is to make the rate attractive to private lenders, as SBA money is supposed to supplement or "catalyze" non-federal financing.

Won't Compete with Banks

(5) SBA will not furnish or help to raise any funds to pick up old debts or to bail you out. Nor will it service your loan after it is made. That will have to be done by a participating bank or an investment banking firm.

The agency emphasizes that it is not set up in competition with the banks, yet it has already invaded bankers' thoughts. Small business has been given top billing for their fall programs. Fear of encroachment in the lucrative junior category, where liberal interest rates prevail, is apparent in the pronouncement of Everett D. Reese, American Bankers Assn.

Some Fear Loans

Speaking before the National Assn. of Supervisors of State Banks, he said, "We should so effectively serve the interest of small business that the demand for government credit or guaranty of loans would be meaningless."

Tendency towards a multitude of small loans, already exemplified by the rapid growth of bank participation in consumer credit, is seen in some quarters as eventually curtailing the supply of large-loan funds.

Opens New England Warehouse

Latest major step by Peter A. Frasse & Co., Inc., in its expansion and modernization program was the opening last week of a new office and warehouse in Hartford, Conn. The firm previously reported servicing the area by its New York warehouse.

Board Chairman Lester Brion told THE IRON AGE that the new plant will distribute alloy, stainless and cold-finished carbon steels in tubing and other forms in the New England area. Up-to-date cutting equipment and a production line system of order processing will facilitate speed and efficiency.

NOISE: Day of Reckoning Dawning

**Guinea pig industrial deafness case victory for labor . . .
Others to follow . . . Compensation law motive misconstrued
... Who must beware, what should be done—By T. Metaxas.**

After a legal tussle that carried up into the Supreme Court, Albert Wojcik, of Green Bay, Wis., last week won a compensation suit for occupational loss of hearing.

In Wisconsin this decision will serve as the starter's gun for other deafness cases held in abeyance pending its outcome. For industry in general the effect will ripple out cross-country, opening the shutters a little wider for the day of reckoning on hearing impairment caused by industrial noise.

That sphere of industry which is inevitably noisy because of the nature of its production should hasten its preparations. For unions in that area, the Wisconsin decision will be a cue to push other compensation cases—and there are thousands reported ripe for the courts. Labor elsewhere has been restrained so far by beclouded aspects of deafness—such as accurately measuring permanent loss of hearing, setting a price on it, and fixing the blame on specific employers.

Compensation Misconstrued

Claiming deafness, Mr. Wojcik nevertheless was not afflicted with loss of earnings while employed by the Green Bay Drop Forge Co. Under the Workmen's Compensation Law he was compensated by Wisconsin Industrial Commission, a decision reversed by a circuit court, then reinstated by the Supreme Court. Significantly, the higher court held that occupational deafness *need not involve loss of wages or earning ability* to be compensable.

Management sources told THE IRON AGE that intent of the Workmen's Compensation Law was being misconstrued. Its motive to compensate for loss of wages was being distorted into paying for physical injuries which did not curtail earning power. How foolish and how serious this broadening of the

compensation concept could become remains for time to tell.

No matter what management thinks of the trend it should recognize that industrial loss of hearing is compensable in many states, will eventually encompass all. That limited but excessively loud portion of industry should prepare its defenses on three fronts:

Where harmful, sustained noise levels are suspected (over 90 to 95 decibels of sound) acoustical treatment of areas and machines should be actively practised.

What Industry Can Do

As a legal defense in meeting compensation cases, industry should finance research to evolve standard yardsticks of measuring degree of permanent deafness, how much of it is significantly harmful, how much is due to age and medical history, and how much can be blamed on the latest employer.

To forestall cropping up of future deafness suits, noisy industries should measure hearing with audiometric tests before hiring, test it periodically to determine susceptibility to deafness or its development. (See IRON AGE, June 11, 1953, p. 55 for comprehensive article on industrial noise.)

Even the experts are in discord over the harmful reaches of industrial noise. As shown by the Wojcik test case, the drop forging industry is especially vulnerable. At the point of hammer impact, noise level thunders at 120 decibels and a general plant noise level of 100 decibels is not uncommon.

Classed by state labor departments as presenting serious noise problems are boiler factories, shipbuilding, textiles, some steelmaking processes, and several other heavy metalworking industries. Metalworking is acknowledged as noisier than most.

As yet acoustical specialists have

not proven that average factory noise levels of under 90 decibels appreciably impair hearing. For sustained noise levels over that figure claims come thick and fast. Consolation is that a fractional part of industry is affected.

Courts of most states have been reluctant to offer clean-cut decisions on such a murky, shifting problem as deafness. No landslide of payments is indicated so long as courts are willing to postpone decisions while the issues clarify. But certain industries will bear the frontal assault of compensation.

Delaying Tactics

To make a just award, degree of deafness must be accurately measured. Yet to do so means removal of the worker from the noisy environment for from 8 to 16 months. Workers are unwilling to lose that much pay on the insecure chance of winning compensation later.

A hazard to noisy industry that may materialize more fully in the future is the uneven pattern of compensation payments from state to state. A firm in one state stung with a high incidence of payments may be put in competitive disadvantage to its fellow across the state line where awards may not be so high nor so numerous.

Since industry has not provided in the past for deafness, courts can prevent financial hardship by stretching out or delaying compensation. Meanwhile industry must disabuse itself of the tendency to regard deafness as one of the risks of holding a job. More and more courts may rule otherwise.

How Loud Industry Sounds

Source	Decibels	Rating
Pneumatic Riveter Pneumatic Chipper	Over 120	Threshold of Feeling (actual physical pain)
Multiple Sand Blast Unit Automatic Punch Press Nail-Making Machine Boiler Factory	100 to 120	Deafening
Noisy Factory Automatic Lathe Unmuffed Truck Loud Street Noise	80 to 100	Very Loud
Circulating Machine "Quiet" Factory Noisy Office Automobile	60 to 80	Loud
Average Office Household Fan Average Conversation Quiet Radio	40 to 60	Moderate

SERVICES: Streamline for Efficiency

Defense Dept., Armed Forces reorganizing operations for greater economy . . . Wilson puts Thomas in charge of logistics, supply . . . Navy, Air centralize—By A. K. Rannells.

Reorganization is definitely the countersign around the Pentagon, where Defense Dept. and the military services are in various stages of streamlining their operations in the interests of efficiency and economy.

Activity begins at the top echelon where Defense Secretary Charles E. Wilson has combined logistics and supply programs to make a central source responsible for procurement, production, distribution, storage, and so on down the line—including requirements and planning.

Replace Munition Board

This is behind the appointment of C. S. Thomas as assistant secretary in charge of supply and logistics. It will be his job to coordinate and weld together department and policies in these broad fields.

In effect, the assistant secretary will be taking over in a large measure the responsibilities which were once assigned to the now defunct Munitions Board.

In the meantime, the subordinate departments have been busy with shifting and centralizing responsibilities.

Air Shifts Responsibility

Air Force has done some reshuffling which has resulted in placing final responsibility for all phases of materiel in the hands of a deputy chief of staff—Lt. Gen. Orval R. Cook.

Gen. Nathan F. Twining, Air Force chief of staff, explains that net effect of the reshuffling will be to funnel into a single place full information on the status of materiel regardless of stage—whether research, development, procurement, production or distribution.

Some changes in the interest of

efficiency can also be expected in field operations. A special task group has been named to study the matter.

Top level officials say, however, that no thought is being given to combining the Air Materiel Command and the Air Research & Development Command. Industry will still continue to deal with the same Air Force offices.

Standardize Items, Inspection

Likewise, Navy Secretary Robert B. Anderson has launched a study of the organizational structure of his department with an eye to wiping out overlapping or duplicating functions and getting responsibilities more centralized.

Under the Defense Dept. realignment of logistics and supply responsibility, a modern storage and distribution system is to be developed and work is to be stepped up on standardizing and cataloging service items.

Also to be worked out is a standard inspection system, whereby one service will be responsible for all inspection in each category rather than each service having its own inspector.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Welders, electric arc, 31, \$98,767, Libby Welding Co., Inc., Kansas City 1, Mo.

Diesel generator sets and maintenance parts, \$533,818, Stewart & Stevenson Services, Dallas, Texas.

Motor generator, 8, \$104,700, Continental Electric Co., Inc., Newark, N. J.

Salinity indicator panel, 88, \$96,598, Pilot Marine Corp., New York.

Class vessel (780-30) motor generator sets, 28, \$184,646, Bogue Electric Mfg. Co., Paterson, N. J.

Economizer headers, 16, \$172,112, Combustion Engineering, Inc., N. Y.

Motor controllers, 42, \$66,161, Cutler-Hammer, Inc., Milwaukee, Wis.

Motor generators, 66, \$126,955, Bogue

Electric Mfg. Co., Paterson, N. J.

Electric direct cranking starters, 1048, \$331,745, Jack & Heintz, Inc., Cleveland, Ohio, P. J. Barenfeld.

Castings, investment cobalt, chromium-

alloy, 16412, \$111,273, Haynes Stellite Co., Kokomo, Indiana, J. W. Todd.

Repair parts for diesel engines, 5284, \$51,958, General Motors Corp., Cleveland, Ohio, A. O. Chash.

Indicators for various aircraft, 514 ea., \$169,362, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., S. F. Keating.

Distributor for various engines, 278 ea., \$69,125, Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y., G. E. Steiner.

Components for use with H25A flight control screwjacks, V, \$68,658, Foote Bros. Gear & Machine Corp., Chicago, Ill.

Quantity gage fuel indicator, 247 ea., \$56,948, Minneapolis - Honeywell Regulator Co., Minneapolis, Minn., S. F. Keating.

Rotar assy., 66 ea., \$53,360, Benson Mfg. Co., Kansas City, Mo.

Maintenance parts for P2V aircraft, V, \$146,273, Lockheed Aircraft Corp., Burbank, Calif., J. S. Card.

Parts for aircraft tail turrets, V, \$84,696, The Emerson Electric Mfg. Co., St. Louis, Mo.

Main strut assy., V, \$53,017, Cleveland Aero Products, Inc., Cleveland, Ohio.

Automatic pilot systems, 33 ea., \$220,750, Lear, Inc., Grand Rapids, Mich.

Maintenance and overhaul parts for HSD propellers, V, \$174,541, United Aircraft Corp., Windsor Locks, Conn.

Steel:

Shipments hit new peak in first 8 months of 1953

Steel mill product shipments for the first 8 months of 1953 topped the old record set in 1951 by 2,675,000 tons. The new alltime peak for the 8-month period is 55,432,982 tons, according to American Iron and Steel Institute figures.

Particularly noted in recent months, export shipments from mills dropped 219,000 tons from 1952 to 1,807,000 tons during the period. At the same time, all major classes of consumers in the U. S. got nearly 15 million tons more steel than last year for a total of 53.6 million tons.

The biggest user gained the most percentagewise and tonnagewise. Auto firms got 10.7 million tons, 20 pct of the total, for a 76 pct increase in the 8 months.

Relatively small consumers came next in line with a 75 pct increase in steel for household appliances; 65 pct more for guns, tanks and similar armaments; 50 pct gain for electrical apparatus; 45 pct higher for domestic and commercial equipment; and a 44 pct boost for aircraft.

The warehouse industry received 2.2 million tons more steel in the period, a gain of almost 28 pct over 1952. The warehouse total of 10.2 million tons was 19 pct of all domestic shipments.

Gillette

insures "Super-Speed" deliveries with Lewis-Shepard Trucks

It's a staggering job — keeping the men of America supplied with Gillette Super-Speed Razors, Shaving Cream . . . and millions of smooth-shaving Gillette Blue Blades a month. Yet the Gillette Safety Razor Company's Shipping Department beats this challenge every time — and insures "Super-Speed" deliveries—with considerable help from a fleet of super-dependable L-S Materials Handling Trucks!

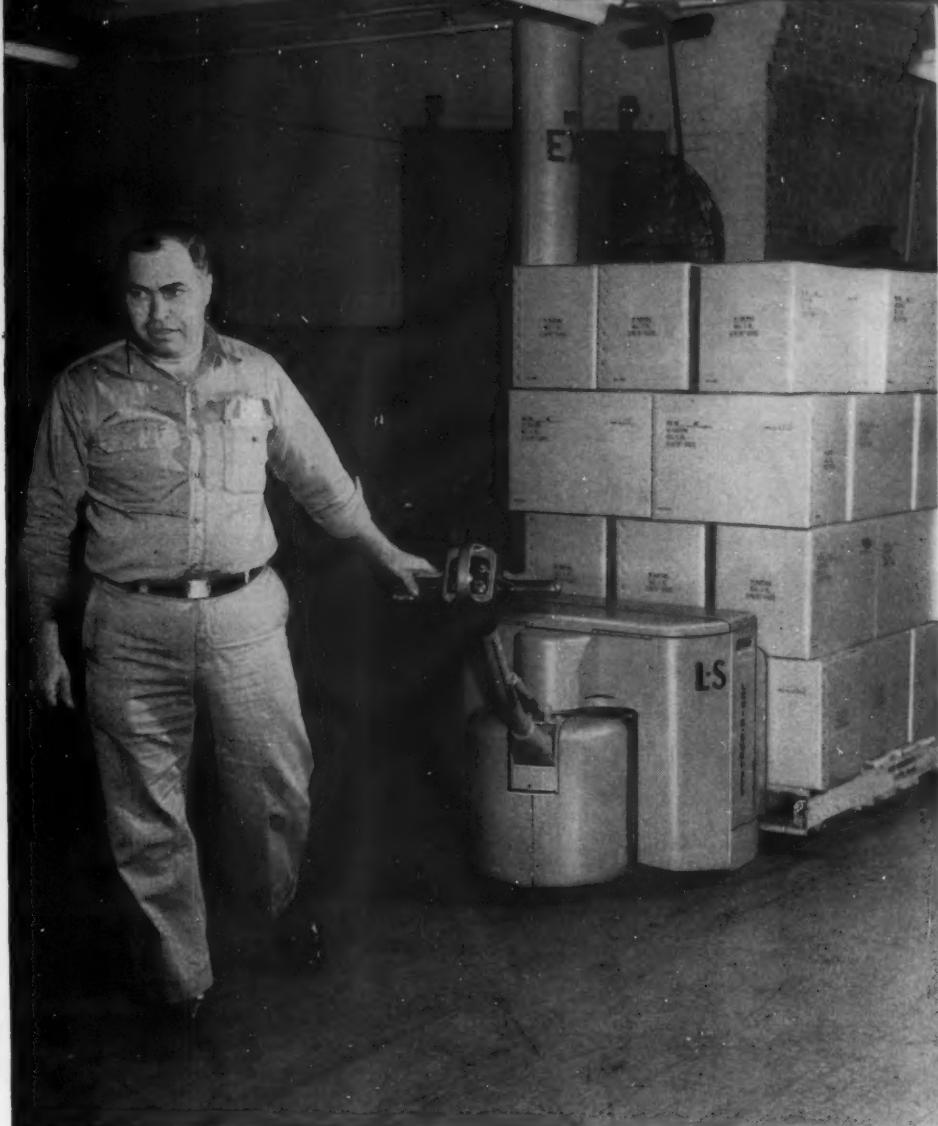
Cost-shaving dependability — One big reason for Gillette's use of L-S Trucks is their outstanding maintenance records. Here are the facts!

With 10 L-S electrics in operation throughout the plant, records for a recent 12 month period (10,400 truck hours) reveal only 39½ hours total downtime for other than routine service. In other words, each truck averaged less than 4 hours of out-of-service time per year. The total cost for parts during the same period was less than \$5 per truck. That's dependability!

Here's what Gillette found — (and you will too) about the unique L-S operating controls on the JackLift Electric Walkie pictured here: All controls, are within easy fingertip reach on the handle head (inset). All controls, including the electric brake, operate with the handle in any position.



The results are faster, safer operation and far greater cramped-area maneuverability. Furthermore, the handle is balanced to minimize operator's arm strain during hauls.



You, too, can enjoy these L-S advantages! No matter what you handle — cornflakes or castings — there's an L-S Truck designed to fit your needs . . . exactly. Learn about the dollar-pinching dependability of L-S Materials Handling Trucks. Write us or call your local L-S Representative, listed under "Trucks, Industrial" in your Yellow Phone Book.

Exclusive also are the L-S Booster Rollers . . . an engineered feature to make pallet entry and exit smoother, without damage to pallet boards.



Happy Customers

Listed are some current L-S reorders from "bluechip" companies in various industries

Motor Car.....	45 L-S in use—reordered	2
Grocery Chain.....	73 L-S in use—reordered	6
Chemical.....	14 L-S in use—reordered	5
Elec. Goods.....	194 L-S in use—reordered	14
Carbon Mfr.....	23 L-S in use—reordered	4
Mfg. Chemicals.....	74 L-S in use—reordered	6
Glass Mfr.....	12 L-S in use—reordered	2
Rubber Goods.....	5 L-S in use—reordered	3



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Industrial Briefs

Gets Oscar . . . OLIVER IRON & STEEL CORP., Pittsburgh, was judged as having the best annual report of the metal products industry in a survey of 5,000 annual reports conducted by Financial World. The corporation will receive the bronze "Oscar of Industry" on Oct. 26.

Meeting Held . . . AMERICAN SOCIETY OF CIVIL ENGINEERS held its annual meeting this week. Interior Undersecretary Ralph A. Tudor, was the convention's principal speaker. Main theme was mass transportation.

Election Time . . . AMERICAN WELDING SOCIETY has re-elected as its president for 1953-54 Fred L. Plummer, director of engineering, Hammond Iron Works, Warren, Pa.

Acquisition . . . E. W. BLISS CO., Canton, Ohio, has acquired Die Supply Co., Cleveland.

Construction Underway . . . JES-SOP STEEL CO. OF CANADA LTD. started construction work recently on a new fine-steel plant at Wallaceburg, Ont.

Bridge Slab . . . U. S. STEEL CORP. reports that a prestressed concrete bridge slab designed to carry a load of 180,000 lb of pressure was tested in Denver recently to a record load of 576,000 lb.

Nearing Completion . . . JOSEPH T. RYERSON & SON, INC., is nearing completion on the addition to its New York area steel service plant. It will increase capacity about 50 pct.

Power Units . . . AIRESEARCH MFG. CO., Los Angeles, has disclosed the development of two new models of lightweight gas turbine auxiliary power units.

Distributor . . . ALLIS-CHALMERS MFG. CO., Milwaukee, has named the Electric Supply Co., Inc., Wichita, Kan., a distributor.

New Members . . . CONTROLLERS INSTITUTE OF AMERICA has elected R. B. Simpson, comptroller, General Steel Wares Ltd., Toronto, and Norman R. Reed, plant controller, Cleveland Mill Div., Chase Brass & Copper Co., to membership.

West Coast Office . . . FOOTE BROS. GEAR & MACHINE CORP., Chicago, has opened a new branch office for sales and service in California to better serve West Coast manufacturers.

Special Conference . . . AMERICAN MANAGEMENT ASSN. will hold a special conference on supervision at the Palmer House, Chicago, Nov. 30-Dec. 1.

Grand Opening . . . SOLAR STEEL CORP. will formally open its new plant in Sharonville, Ohio, on Nov. 9.

Elbow Room . . . KURT ORBAN CO., INC., Cleveland, has moved its Cleveland office and service center to larger quarters at 1256 E. 12th St.

New Section . . . WESTINGHOUSE ELECTRIC CO., Pittsburgh, has formed a new engineering section responsible for a development, designing and test program involving certain equipment for nuclear power plants.

New Home . . . JAMES H. KNAPP CO. has moved into its new plant at 1731 Workman St., Los Angeles.

Gets Contract . . . TEMCO AIR-CRAFT CORP. has received a prime overhaul contract to provide progressive heavy maintenance for Navy "Super Constellations."

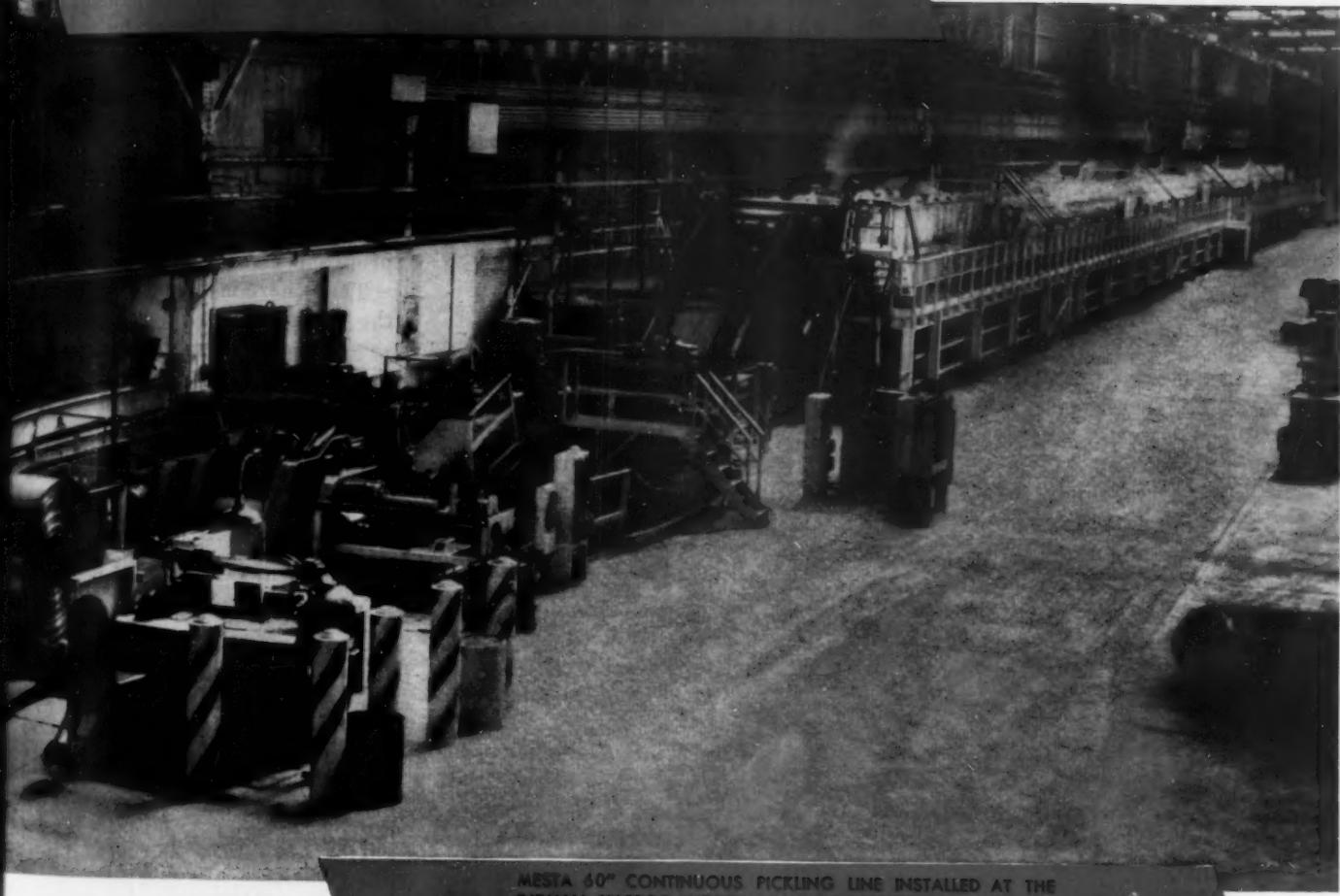
The Winner . . . Herman S. Rosenbaum, metallurgist, of THE FRANKLIN INSTITUTE LABORATORIES for Research and Development, has won the 1953 Student Paper Contest sponsored by Philadelphia section of the American Institute of Metallurgical Engineers.

Tubing Plant . . . TUBE REDUCING CORP. reports that a \$10½ million naval industrial plant is now being built at Wallington, N. J., to produce large diameter aircraft tubing for the Navy Bureau of Aeronautics.

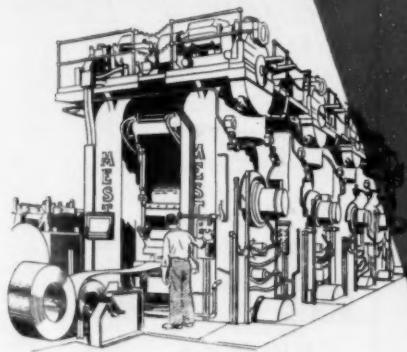
Congrats . . . William Embry Wrather, past president of THE AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS, INC., New York, and a director of the U. S. Geological Survey, has been awarded the John Fritz Metal by unanimous choice of a 16-man board.

MESTA

HIGH-SPEED CONTINUOUS PICKLING LINES



MESTA 60" CONTINUOUS PICKLING LINE INSTALLED AT THE
INDIANA HARBOR WORKS OF THE INLAND STEEL COMPANY



AFTER PICKLING, COILS OF STRIP STEEL ARE COLD
ROLLED ON A MESTA HIGH-SPEED TANDEM COLD MILL

Designers and Builders of Complete Steel Plants

MESTA
MACHINE COMPANY
Pittsburgh, Pa.

The Automotive Assembly Line

Production Planning Herculean Task

New model planning one of Detroit's biggest organizational jobs . . . Parts list may run over 15,000 items . . . Make or buy is big question . . . Other factors vital—By R. D. Raddant.

There are approximately 15,000 individual parts in today's automobile. Each has to be designed, made or purchased, and assembled into the automotive unit before one of today's new cars rolls off the assembly line.

It's a massive organizational job between management's approval of final design and announcement date of a new car. At that time there must be several thousand already distributed and a full production rate in progress.

Coordination Comes First . . .
Size and scope of the job, together with the mass of detail that must be surmounted, is outlined in General Motors Journal by Edward T. Ragsdale, manager of manufacturing at Buick.

Of course, the final design isn't a complete surprise to production when it is approved. Mr. Ragsdale calls close coordination with engineering the first job of production "so that final design is one that can be manufactured efficiently at a minimum reasonable cost."

Make or Buy? . . . Then comes an important decision involving each part—whether to manufacture at Buick or to purchase it outside.

"These words—make or buy—are heard almost daily in new model preparation and they are extremely important. The decision on each is a vital key to the eventual success," he states.

Production activity begins when engineering drawings and parts lists are sent to standards and cost departments and to the master mechanic. Purchasing, metallurgy, process, production control, traffic and assembly come in later.

Using announcement date as

initial point, a schedule is set up, going backwards in time from that date the length of time required to build the number of cars required for an announcement. This establishes the date of production which in turn is used in establishing dates for die tryout, tooling tryout and pilot assembly operations.

The master mechanic submits his estimate of expenditures for equipment, tools, labor costs and other expenses to give a comparative cost presentation of the new model.

What It Needs . . . An important function in new model planning is played by production control, which starts work as soon as a target date is set. Its responsibilities fall into two categories: balancing out outgoing model production and planning production of the new product.

On the new model, these questions must be studied:

If parts are purchased, will they be finished or require additional work?

At what point of the manufacturing cycle will they be required?

What lead time is needed for shipment, inspection and subassembly?

Will specially engineered containers be required for materials handling?

Check With Tool Builders . . .
Mr. Ragsdale calls purchasing department the unsung hero, maintaining contact with 350 producers of production parts, buying some 2200 parts from them. He says purchasing buys non-productive items from a total of 7500 suppliers.

When a tentative plan is com-

pleted, machinery manufacturers are called in to receive their ideas on getting better performance, minimum downtime, and easier maintenance. Any engine change affects the assembly line and hooks, fixtures, block test stands and balancing machines. If a change affects the job done by one of the huge transfer machines, major revisions become necessary.

More Production Problems . . .
Among the major problems of production are the lesser but vitally important problems involving other activities. They include new personnel, medical and cafeteria facilities, salvage and waste disposal. Safety, fire protection, plant protection all have definite functions in almost any new model program, Mr. Ragsdale points out.

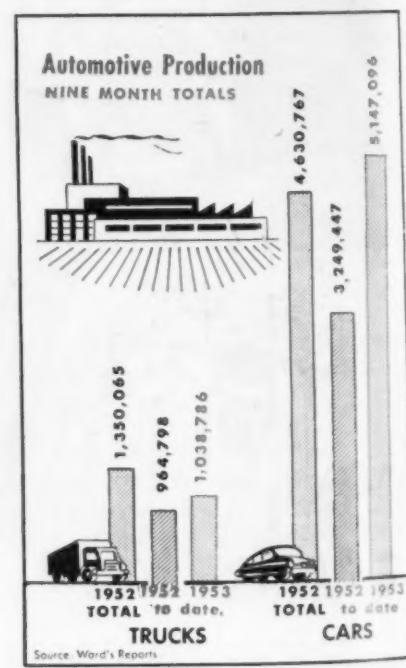
Then there is final assembly and the main questions that must be solved here. Mr. Ragsdale lists them in this order:

In what order will parts be put together?

What subassemblies can be made?

Will a purchased part be painted later or will it be bought painted?

Will Buick assemble certain



Automotive News

parts or assign them for assembly to Fisher Body, which provides Buick bodies?

Are present facilities adequate for the new model?

Is wrench clearance adequate for the new part?

Tework A Must . . . A run sheet is made out listing the order in which models are to be built. It is distributed to about 90 points to show the order in which materials are placed into assembly.

Production:

Hudson switches to B-W shift after GM plant fire loss.

Hudson Motor Car Co. became the first non-General Motors user to desert Hydra-Matic transmission as a result of the Detroit Transmission fire.

Hudson was one of several automakers which purchased automatic transmissions from GM and lost their source of supply when the fire completely destroyed the manufacturing facilities.

Find New Source

This independent went to Borg-Warner and has now completed arrangements with B-W to supply automatic transmissions for 1954 Hudsons. The company stated that the transmission was developed expressly for use with Hudson's "Instant Action" engines which are featured in new models. B-W transmissions are in use on Ford, Mercury and Studebaker cars and this company had been called a logical source for others equally hard hit by the GM fire.

GM had also supplied Nash, Kaiser, and Lincoln, which also face the problem of finding a replacement or waiting for GM to retool at the leased factory space at Willow Run.

Await GM Return

Just how long it will be before Hydra-Matics are again in production continues to be one of the Detroit mysteries. About 1700 machine tools have been received at

Willow Run since the fire. More than 3000 tools were removed from the burned plant. First source of Hydra-Matics, however, is expected to be the Detroit Transmission's old plant in Detroit. Manufacturing had just been moved to the new Livonia plant when the fire struck and many of the facilities remained at the old plant.

Meanwhile, GM divisions are producing at a creditable rate using transmissions borrowed from their divisional cousins. Cadillac has made 5773 cars with Dynaflow, Oldsmobile, about 7000 cars also using Dynaflow, and Pontiac, 7068 cars using Chevrolet's Powerglide.

Marketing:

Customer has over 300 million options on one make alone.

Did you ever stop to consider how many options you have when you buy a car? It's more than 300 million, even after you have picked out the make.

THE BULL OF THE WOODS

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Oct. 17, 1953..	126,737*	24,735*
Oct. 10, 1953..	122,940	25,839
Oct. 18, 1952..	106,277	31,811
Oct. 11, 1952..	111,169	32,065

*Estimated: Source Ward's Reports

Of course, there are probably wide variations from auto to auto, but Cadillac put two top mathematicians at work on the problem and came up with 327,452,938 options within Cadillac alone.

The mathematicians, Dr. Lyle E. Mehlenbacker, chairman of the University of Detroit's Mathematics Dept. and Gerald E. Markle, vice-chairman, computed combinations involving color, upholstery, wheel trim and tire choices and still arrived at 2196 combinations for the 60 Special sedan alone.

Fourteen factory installed options and accessories multiply that number to more than 35 million for the one sedan style alone. Coupled with seven other body styles and the figure reaches beyond 300 million.

By J. R. Williams



IT'S PERFORMANCE THAT COUNTS

...there's more
to a champion
than the tape
measure shows!



Champion Pitcher . . .
he keeps control
in the tight spots!



Average Pitcher . . .
he may measure the
same . . . but he loses
the tight games.

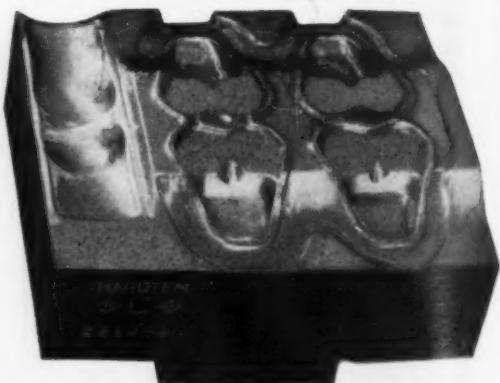
HARDTEM DIE BLOCKS

perform like "champions"
in your production line!

Heppenstall Hardtem Die Blocks perform like "champions" because they possess those extras that result in superior quality. Their patented steel analysis resists softening and heat checking in service. Records from plants using Hardtem Die Blocks prove the following benefits for production:

- ★ Long life of dies
- ★ Holding of true dimensions
- ★ Less down time
- ★ Longer production runs
- ★ Lower overall die cost

It will pay you to try Hardtem Die Blocks. Call Heppenstall Company, Pittsburgh 1, Pa. Sales Offices in principal cities.



Heppenstall

...the most dependable name in die blocks

This Week in Washington

No Hope for Balanced Budget in '55

New or higher taxes possible next year . . . See compromise
4 pct corporate tax cut instead of slated 10 pct drop . . .
Expect \$9.5 billion deficit in '55—By G. H. Baker.

The official disclosure by Budget Director Joseph M. Dodge that the Eisenhower Administration has abandoned hope of a balanced budget in fiscal 1955 (fiscal '54 already has been written off) points up the strong possibility of some new or higher taxes next year.

Scheduled reductions in taxes are now in jeopardy, as a result of the government's continuing gap between revenues and spending. A check of congressional opinion indicates that the planned cuts in individual income levies probably stand the best chance of going through as scheduled. But hope for the promised reductions in corporate income and excise rates is definitely waning, both at the Treasury and within Congress.

May Compromise . . . Under existing law, corporation tax rates are slated to drop about 10 pct on April 1. As a result of Mr. Dodge's pessimistic forecast, influential Senate and House members are now talking about a 4 pct cut, in lieu of the scheduled 10 pct drop. It is considered entirely possible that the Administration will urge Congress to suspend completely the scheduled reduction. A compromise figure of around 4 pct is therefore regarded as a likely median figure, in this event.

One definite prospect, however, is the expiration of the excess-profits tax on Jan. 1, 1954. Both the Administration and the Congress are in agreement on this point. Barring outbreak of a crisis, this tax will not be renewed.

Seek Excise Cuts . . . Outlook for excise relief is clouded over

by the many plans for raising new money now under discussion at the Treasury. A number of excises that went into effect in 1950 will expire next year unless Congress acts affirmatively to fore-stall the scheduled reductions. Products affected include automobiles, automotive parts and accessories, gasoline, liquor, and tobacco.

Various retailing groups, including those representing the jewelry, luggage, and fur trades, are demanding relief from the existing 20 pct rate that has been in effect in their industries since World War II. And household appliance manufacturers, who are forced to collect a 10 pct excise on many of their products, are confident that any lagging sales lines could be hypoed substantially by removal of this tax.

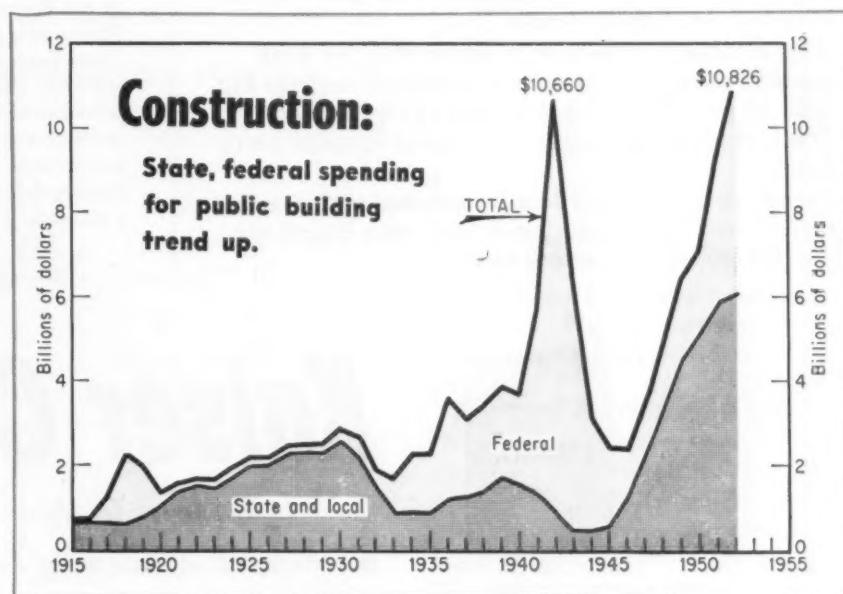
Oppose New Tax . . . Over-shadowing the entire excise picture, however, is the threat of a

general manufacturers' sales tax. Retailing opposes a manufacturers' tax just as much as it does a consumer sales tax, principally because (1) retailers would be forced to pay higher taxes on the basis of their over-valued inventories, (2) store rents, and other costs which vary with dollar volume of sales, would be increased by the manufacturers' tax.

Treasury Secretary George M. Humphrey has not yet announced whether he will ask Congress in January for a manufacturers' tax. He admits that he is considering such a tax, along with others.

Two Choices . . . If federal spending continues at its present rate, the government faces an almost-certain deficit of about \$9.5 billion in fiscal 1955. Spending—largely for defense purposes—seems to be headed for the neighborhood of \$72.1 billion, while anticipated revenues probably will total only \$62.6 billion.

As a result, the Administration and the Congress are faced with weighty alternatives: Give up tax reduction, or give up the goal of a balanced budget. Practical politics being what it is in election years, such as next year, it seems





Colorado Fuel and Iron open hearth being resurfaced with Permanente 165 Ramming Mix. It's one of the many refractory materials we regularly supply to C F & I.

INCREASE YOUR OPEN HEARTH PRODUCTION

WITH PERMANENTE 165 RAMMING MIX!

THE UNBEATABLE combination of Permanente Ramming Mixes and Permanente Basic Bricks provides superior open hearth performance for many of the country's leading steel mills.

This combination results in lower cost per heat . . . gives a better bottom with added protection from tap hole to pan. This makes it possible for furnaces to break production records, with extra tonnage every hour.

Permanente Ramming Mixes combined with Permanente Basic Bricks can boost your open hearth production well above current rates.

Send for booklet giving all the important advantages of (1) Permanente 165, (2) the companion material, Permanente 84 and (3) Permanente Refractory Brick. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.*



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highly likely that Congress will vote some—probably limited—tax cuts and will then attempt to explain why a balanced budget is "impossible."

No Red Trading . . . Removal of government restrictions on U. S. construction of merchant ships for foreign buyers has not affected the ban on use of these vessels for trade with countries in the Russian orbit.

One of the former limitations provided a fixed period during which a vessel built in a U. S. yard could be requisitioned by this country. Another called for surety bonds, under certain conditions.

Better Competition . . . These restrictions do not apply to future construction, but Maritime Administration still must approve ownership and continues to require shipbuilders to give assurances that vessels they build will not trade with Iron Curtain countries.

Commenting on the more lenient policy, Maritime Administrator Louis S. Rothschild says domestic yards now should be able to compete for new construction on "more favorable terms" than were available earlier, "subject to currency restrictions."

Push Air Freight . . . Airlines are increasing efforts to have more freight sent by air shipment—already up this year by one-fifth over last year. Emphasis will be placed on such major points as the speed of air freight, which in turn, it is contended, decreases space needs for inventories. Also to be played up is the probable savings in packaging costs since many items can be shipped in original factory containers.

Give Northeast Water Facts

Two new pamphlets offered free by U. S. Geological Survey give facts on the suitability of water for industrial purposes in the cities and towns of nine northeastern states.

October 22, 1953

Circular 283 discusses water resources for New York-Pennsylvania-New Jersey.

Circular 288, "The Industrial Utility of Public Water Supplies in the New England States, 1952," presents material of the same kind on the other six states.

Scrap:

Commerce Dept. relaxes export ban on open-end basis.

U. S. Commerce Dept. arrived at a decision over the weekend to adopt a temporary policy of permitting steel scrap exports on an open-end basis.

This policy will stand for the remainder of the fourth quarter, officials said. Previously, it had been intended to issue export licenses for less than 50,000 tons, all for Mexico.

Decision in effect accedes to pressure brought by scrap dealers who pointed to the downward market trend of scrap. Those located at some distance from steel mills were especially persistent that restrictions be relaxed.

Argue Against Surplus

Spokesmen for consuming industries have been almost unanimously opposed to relaxation for at least the rest of 1953.

They maintained that no matter what the market price levels were, or are, there is still no scrap surplus.

Moreover, they added, steel mill scrap inventories generally are no higher now than last spring. To



steel men, this spells out a definite possibility of scrap shortages before the winter is over.

Assistant Commerce Secretary Samuel W. Anderson says both sides of the question have been weighed and that for the present, as a safeguard, the policy will be kept on a quarter-to-quarter basis.

Even so, he says, domestic requirements will be further safeguarded. Bureau of Foreign Commerce (formerly OIT) will place special limitations on validity periods for licenses and will require frequent reports from the Customs Bureau on actual shipments. Export trends will be studied.

Construction:

Offer of tax inducements spurs grain bin building.

Government offers to grant not only 100 pct tax write-offs but also to guarantee occupancy of grain storage facilities have resulted in a landslide of construction applications at the U. S. Dept. of Agriculture.

As of Sept. 30—the deadline filing date—applications had been made for sufficient grain storage construction to provide warehousing for close to 550 million bushels.

Through Oct. 15, certificates had been issued for enough new warehouse projects to provide storage for more than 111 million bushels of grain.

Most of these new certificates of necessity for grain warehousing give write-off coverage for 100 pct of the cost under an amendment in August to the Internal Revenue Code.

This amendment, made by adding Sec. 124B, applies to grain storage facilities constructed this year or later. Earlier certificates allowed a maximum write-off of 40 pct.

However, the Office of Defense Mobilization said last week, it will cancel on request all earlier certificates of necessity which permit only the lower write-off. New certificates will be issued permitting the higher write-off allowance.

"Paid for itself on 50,000 Parts"

says A. J. Houseman, vice president of Automatic Radio of Boston, in discussing his firm's use of

MULTIPRESS®

Here again, Multipress paid off fast—for this manufacturer of radio sets for leading makes of cars.

A 50-ton Multipress blanks, pierces, and draws cold rolled steel to form auto radio cabinets and front escutcheon plates that are stronger and better finished than the die-cast parts they replace.

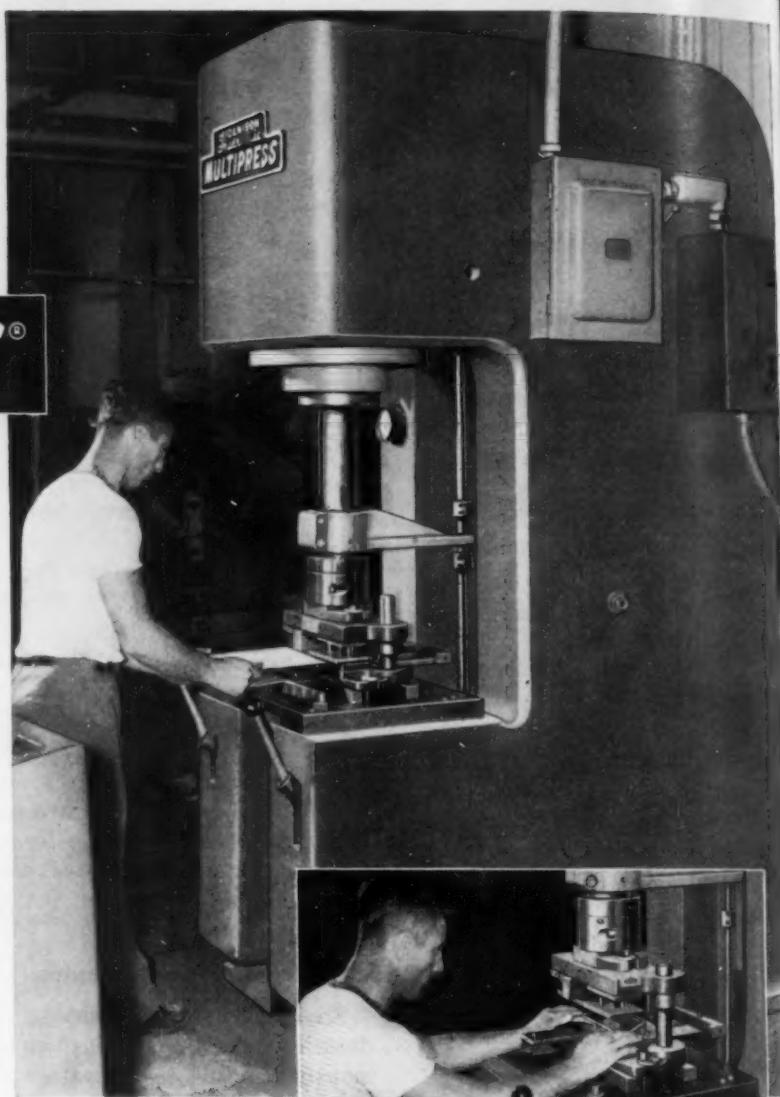
In addition, costs are so much lower that Multipress literally paid for itself on one run of 50,000 parts.

This remarkable saving is made on two operations handled on a 50-ton Multipress. In a single stroke, flat predeveloped blanks of .032 cold rolled steel are deep-drawn under 18-ton pressure to the intricate shape shown in Fig. 1—a job that ordinarily required 2 or 3 separate operations. Later, the same Multipress blanks and pierces the parts as shown from the back, in Fig. 2.

Easy, stepless adjustment of the Multipress ram effort permits pressures to be set just above the point at which dies "break through" the metal. Added to the smooth, controlled hydraulic ram action, this cuts "die punishment" to the bone. When dies become dull and fail to break through, they're quickly resharpened with minimum grind-off—hence, dies last four to five times longer than in the previous method.

Production speeds now reach 400 per hour on blanking, 1500 per hour on the drawing and forming. On a smaller radio head of .040 chrome plated cold rolled steel, output is up to 2100 parts per hour. Scrap loss is also drastically reduced.

Automatic Radio is now adapting several other jobs to Multipress, with the idea of matching the gains made on these typical examples.



ABOVE: Clear, easy access to tooling, full visibility, easy parts-loading from comfortable sitting position, and dual safety controls make Multipress popular for easy operation as well as for cost-cutting efficiency.

BETWEEN: Two views of a part that is first deep-drawn, then blanked and pierced, on a 50-ton Multipress that paid for itself in reduced costs on only 50,000 parts.



Because both the action and pressure of its ram are so widely adjustable and are fully controlled at every stage of operation, Multipress readily meets an amazing variety of needs for fast, safe, low-cost production. Multipress is available in 9 frame sizes—bench and floor types—in capacities from one to 75 tons, with manual or automatic controls for almost any requirement. Standard Multipress feeds and accessories offer extra speed and efficiency on many types of operations. Write for full details.

DENISON
HydroOILics

THE DENISON ENGINEERING CO., 1158 Dublin Rd., COLUMBUS 16, OHIO

West Coast Report

Aluminum Extruders Eye New Markets

Reynolds developing large diam oil pipe . . . Light weight would save handling costs . . . Current 12-in. diam could be exceeded . . . Architects use more—By T. M. Rohan.

Aluminum pipe extruders—long confined to irrigation and special tubular goods—are eyeing new markets in petroleum gathering lines.

Reynolds' Phoenix extrusion plant, one of the largest in the world, is currently working on development of pipe in 8 to 12 in. diam sizes.

Light Weight Saves . . . The necessary high strength aluminum would cost more than the steel now used, but major savings would be realized in slashing manual handling costs through lighter weight—about one-third that of steel pipe. In some special cases corrosion damage can also be reduced or eliminated.

Current pipe extrusions are capable of handling up to 80,000 psi so pressure is not expected to be a limiting factor. Largest pipe extrusions to date are 12 in. diam but if market justifies, higher capacity presses could be obtained for transmission line class.

Architects Want More . . . Reynolds' Phoenix plant is also invading the rich automobile market with window frames for Nash automobiles, now representing a large tonnage item. Heaviest new market is in the architectural field with available supply the major limiting factor.

Plant started in 1943, has been operating 3 shifts daily, 7 days per week since 1950. It takes a major share of the pig from Troutdale and Longview, Wash., reduction plants, is starting to get some from the new Corpus Christi, Tex., plant.

Big Boy . . . Newest entry among large diameter pipe producers is

a continuous straight seam welder for pipe to 36 in. diam at Structural Steel & Forge Co., Salt Lake City. Previously limited to seam welding of 20 in. pipe, the new unit doubles plant capacity.

Pipe is regularly produced in 10 ft. lengths and butt-welded for longer lengths. Pipe to 70 in. diam can also be turned out with existing bending rolls and a Horn jig with traveling head.

Torture Test . . . Prestressed concrete slabs, newest construction applicable for heavy cable, last week took their most punishing test to date. Before engineers of the American Assn. of Railroads at Denver, a 15-ton concrete slab using $\frac{1}{2}$ -in. cable specially produced by American Steel & Wire at Worcester, Mass., and stretched to 750 tons before pouring concrete withstood 288 tons pressure, three times the design load, before breaking.

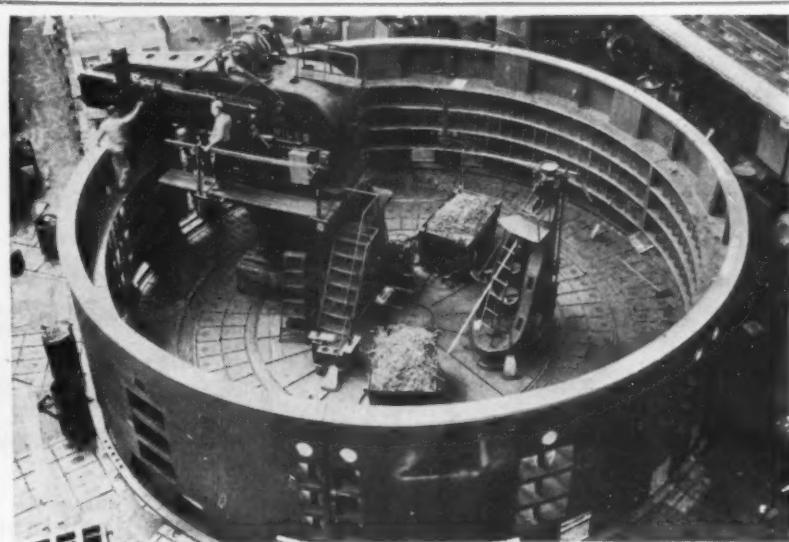
Giant nutcracker for the tests

was the U. S. Bureau of Reclamation's 2500-ton Universal testing machine, largest in the world.

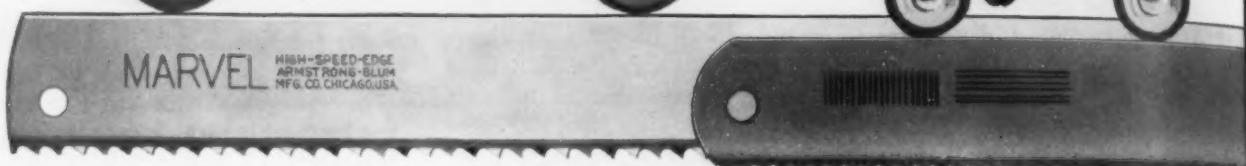
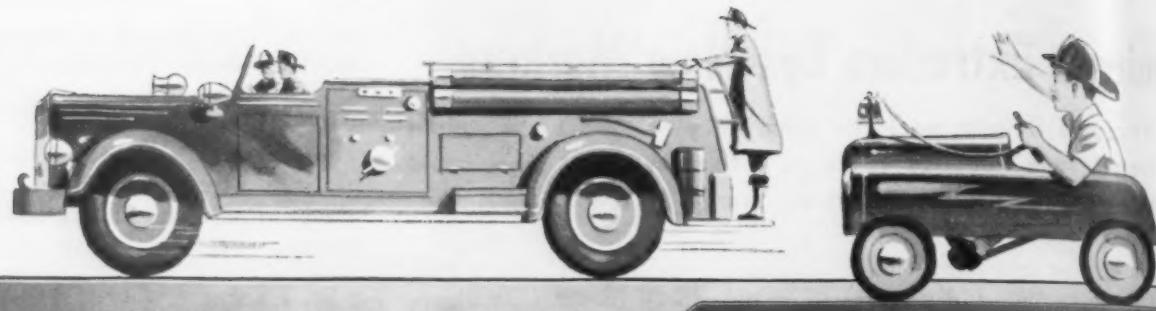
See Bridge Use . . . F. P. Drew, assistant structural research engineer of AAR, said if prestressed concrete lives up to its billing, U. S. railroads will begin using slabs for railroad bridges. Major advantage is elimination of tension cracks due to constant pounding from trains which causes moisture seepage and resulting concrete deterioration. Some European railroads are now using such slabs but major U. S. use so far is in highway bridges.

Yankee Twist . . . Sir Donald Bailey, famed British inventor of the wartime Bailey Bridge, this week saw how the Yanks improved on his brainchild.

At the Allison Steel Co., Phoenix, Ariz., fabricators, Sir Donald inspected first mass-produced sections in aluminum rather than his steel version. Built in 15 x 8 ft sections of rectangular fabricated plate with heavy section beam X-members, the frames are hung together with 3 in. steel pins for crossing gaps up to 240 ft. Changing army needs caused the modification.



STATOR FRAME for third of 12 hydraulic turbine-driven generators for McNary Dam on Columbia River is machined on boring mill at General Electric, Schenectady.



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—with the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

Machine Tool High Spots

Builders Question ODM "Exception"

ODM has ordered government tools not to be leased for non-defense use except in extraordinary cases . . . Fear flood of claims . . . Must wait for effects—By E. J. Egan, Jr.

A possible "exception" in the latest order of Defense Mobilization pertaining to storage of government-owned machine tools has machine tool builders a bit nervous.

The new order—Defense Mobilization Order VII-4—provides that production equipment and tools owned by the Defense Dept. and other government agencies, and for which there is a known or anticipated mobilization need, will be stored and kept in efficient operating condition at or near the plants which will use them in event of an emergency.

So far, so good. But now comes the big question, as the order further states that these packages are not to be leased for non-defense purposes except in extraordinary cases approved by the ODM and where such usage would prove to be in the best interests of the national defense.

Expect Flood . . . There will undoubtedly be a lot of pressure applied to get ODM approval to lease many of these government-owned machine tools to non-defense users. The "extraordinary case" claim will be heard often in attempts to prove that such usage might conceivably be in the best interests of national defense.

Existing leases of government-owned equipment are not affected by the new order, and machine tool builders will have to wait to see whether possible new leases will affect their sales to any significant degree.

Productivity Is Strength . . . Everybody likes the "Yankee Dollar," and a very special fondness for this type of currency exists among European producers of durable goods.

they have had on cost reduction, simplification, interchangeability of product, public safety and the national defense.

Need More . . . But in the machine tool field, the speaker deplored the quality of electrical standards as developed by the Joint Industry Conference in parallel with those of the National Machine Tool Builders Assn. He called on the technical staffs of machine tool builders and users alike, to eliminate the dual standard, which he feels is wasteful.

Mr. Blackall questioned whether there is not, on occasion, too much of a technical and theoretical bias in the establishment of certain standards, and a disregard for the costs involved. "The manufacturer is impelled to produce the optimum result at the lowest possible price. It seems wasteful to him to demand two or three hundred dollars extra from his customer in order to provide electrical apparatus which will do the same job—in a different manner, but in most cases no more safely, not as conveniently, and no better," he said.

Too Much Influence . . . In viewing the great influence of the automotive industry on machine tool design, Mr. Blackall pointed out the error in assuming that design features practical and necessary for these mass production industries will probably be suitable for everybody else.

"A tremendous field is open to the machine tool builder and to the electrical supplier in simplifying the design of general purpose tools. There are a great many operations, even within the mass production industries, which can be performed just as rapidly on a general-purpose machine tool as they can be on one of the more complex models. In such cases, many of the more expensive features simply are not used, but they have to be paid for," Mr. Blackall stated.



SUB-BASEMENT security area is being erected at Cincinnati Milling Machine Co. to provide emergency shelter for employees.



No, he doesn't know them all like a book...

but... there's one phase of virtually every business which Lyon Steel Equipment Dealers know "from cover to cover." That phase has to do with helping their customers make the most out of steel equipment in terms of savings in time, labor and money.

A highly diversified line of more than 1500 standard Lyon items enables Lyon Dealers to meet the varying needs of business, industry and institutions—*better*. A very few typical products are shown below.

Lyon also has facilities for special contract work.

FACTORIES IN . . . AURORA, ILL., AND YORK, PA.

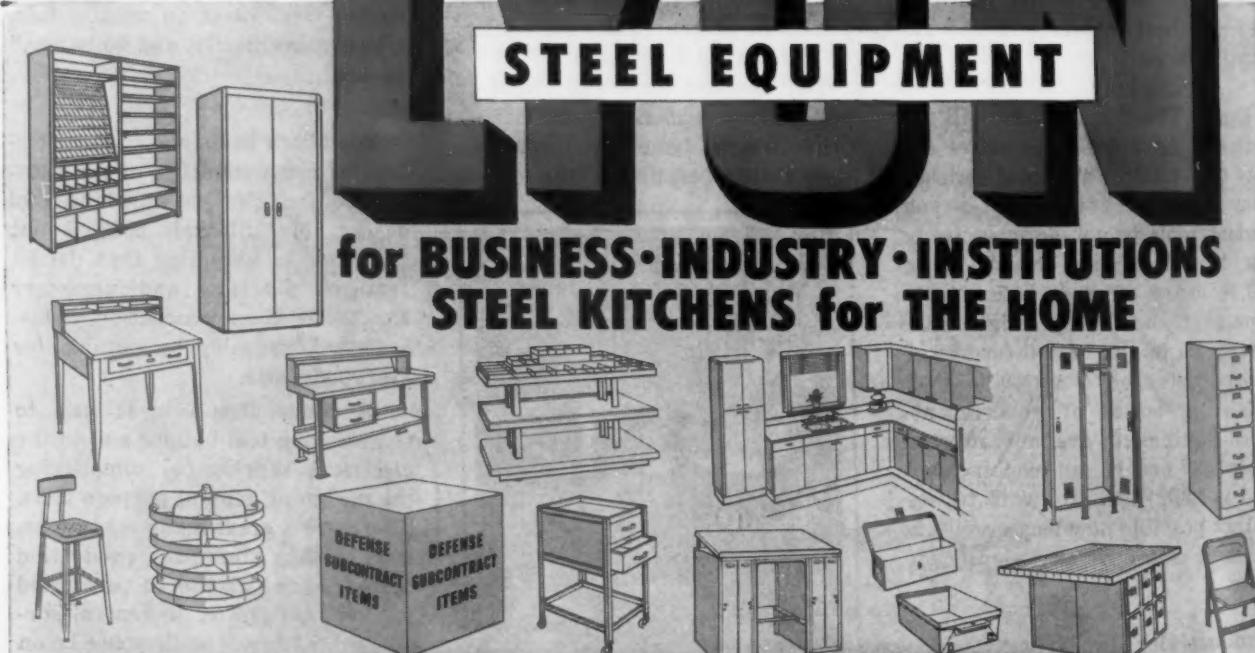
LYON METAL PRODUCTS, INCORPORATED

General Offices: 1036 Monroe Avenue, Aurora, Illinois
Dealers and Branches in All Principal Cities

LYON

STEEL EQUIPMENT

for BUSINESS • INDUSTRY • INSTITUTIONS
STEEL KITCHENS for THE HOME



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- Shelving
- Kitchen Cabinets
- Tool Trolleys
- Economy Locker Racks
- Display Equipment
- Filing Cabinets
- Service Carts
- Lockers
- Cabinet Benches
- Bar Racks
- New Freedom Kitchens
- Flat Drawer Files
- Folding Chairs
- Tool Stands
- Stools
- Storage Cabinets
- Tool Boxes
- Toolroom Equipment
- Revolving Bins
- Work Benches
- Shop Boxes
- Bin Units
- Drawing Tables
- Parts Cases
- Wood Working Benches
- Hanging Cabinets
- Bench Drawers
- Drawer Units
- Hopper Bins
- Shop Trays
- Shop Desks

REPORT TO MANAGEMENT . . .

Tonics, not recession stoppers

Economists extolling virtues of built-in governmental recession stoppers sometimes reach giddy heights of optimism. Such factors as unemployment compensation, pensions, money and credit manipulation by the Treasury, federal roadbuilding will no doubt prove their merits as tonics to purchasing power and production. But they may be flimsy bulwarks should serious economic trouble develop. Prosperity will continue to be sustained mainly through industry's invigoration by virile consumer demand.

Boom's win streak is broken

And production-demand today seems to have rounded the corner towards moderation. Month-by-month gain streak of the boom was broken in the third quarter as value of national output inched slightly but significantly downward. Rising steadily since 1950 to its peak of a \$372.4 billion annual rate in second quarter '53, value of national product eased to a \$371 billion rate in the third, according to the President's Council of Economic Advisers. Previously, Federal Reserve Board's September production index dipped to 234 from August's 236.

Output loss self-inflicted

While production eased, third quarter rate of consumer spending upsurged to a record \$233 billion, an advance of \$2.6 billion. Obviously not caused by a wilting of demand, some of industry's output loss was prudently self-inflicted by trimming the rate of inventory accumulation below production levels. August book value of business stocks were estimated at \$77.8 billion. The \$450 million gain registered was considerably below the average increase of previous boom months.

Strategic stockpile retreat

A shrewd retreat to higher ground in the face of waning demand is what's signified by industry's stockpile caution. That a disproportionate part of the inventory hike fell to finished items rather than raw materials gave a liberal clue that expanded output is abreast of or has passed towering demand. Alerted by shrinking order backlogs, manufacturers are shearing stocks to a point of flexibility. In itself this paring is shortening order books of industry in general and was given an assist by the falter of defense spending. In the third quarter defense outlays were notched down to a \$57.5 billion rate from \$61 billion in the second.

Cautious is byword of retailers

Since inventory caution is also the byword of retailers and wholesalers, most of the finished goods stocks rise was at the manufacturer level. At the end of August, retailers' stocks were worth \$21.8 billion, registering only a minor gain when high sales are considered. Wholesaler's stocks showed practically no change. No jam-up of supply should occur at the selling stratum to afflict industry with an unforeseen, sheer decline of orders.

Sales, order spread widens

Downtrend of the boom is pointed up by the ratio of manufacturers' sales to new orders. When the boom is at full potency these two are more or less closely aligned. Today, orders plod along behind sales. August manufacturers' sales were \$25.5 billion with new orders at \$22.8 billion. Seasonally adjusted August sales declined \$1 billion from July, though still surpassing August '52 by \$3.5 billion. More sensitive as an indicator of the boom's moderation were unfilled orders which fell 3 pct in August to \$67.7 billion -- or 10 pct under August 1952. Matched against the sales rate, August unfilled orders could assure 2.7 months of work against 3.3 months a year ago.

Personal Income inches down

Down wriggle of August's personal income rate piled up further evidence that the economy was swerving into adjustment. From a record \$287.5 billion in July, it slipped to \$287 billion.

ELECTRIC

FURNACE

STEELS

STANDARD STRUCTURAL ALLOY • BEARING QUALITY
ALLOY TOOL • SPECIALTY • NITRALLOY • CARBON TOOL
AIRCRAFT QUALITY

Hot Rolled • Forged • Annealed • Heat Treated
Normalized Straightened • Centerless Ground
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COPPERWELD STEEL COMPANY • WARREN, OHIO

117 Liberty Street New York, New York	P. O. Box 1633 Tulsa, Oklahoma	325 W. 17th Street Los Angeles 15, Calif.	803 Loew Building Syracuse, New York
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	7251 General Motors Bldg. Detroit, Michigan	Monadnock Building San Francisco 5, Calif.	



Photos courtesy Kirk & Blum, Cincinnati, Ohio

72 HOLES

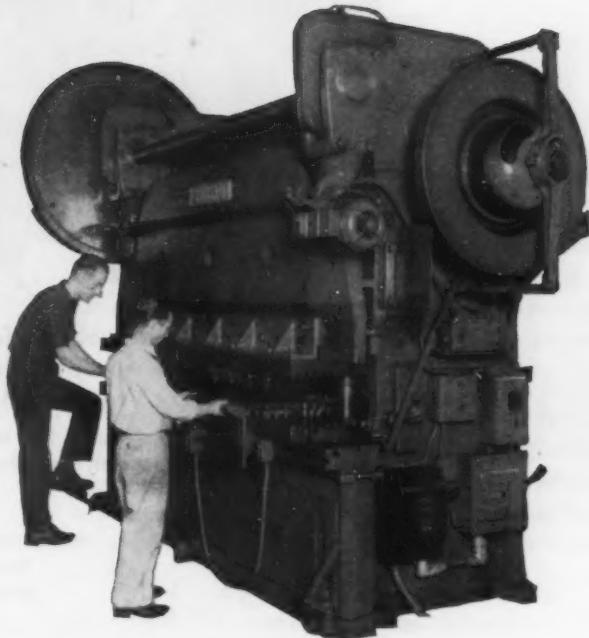
where they belong

Economical assembly depended on maintaining the accurate spacing of these 72 holes and their accurate positioning on this 10-gauge sheet.

This Cincinnati Press Brake is giving a high production at low cost by its speed and accuracy of performance, which insures rapid low cost assembly.

As a press, they offer high production with low investment. As a Press Brake, their low set-up costs, quick change-overs and versatility bring profits.

Write for Catalog B-4 where many examples of the versatility of Cincinnati Press Brakes are illustrated.



THE CINCINNATI SHAPER CO.

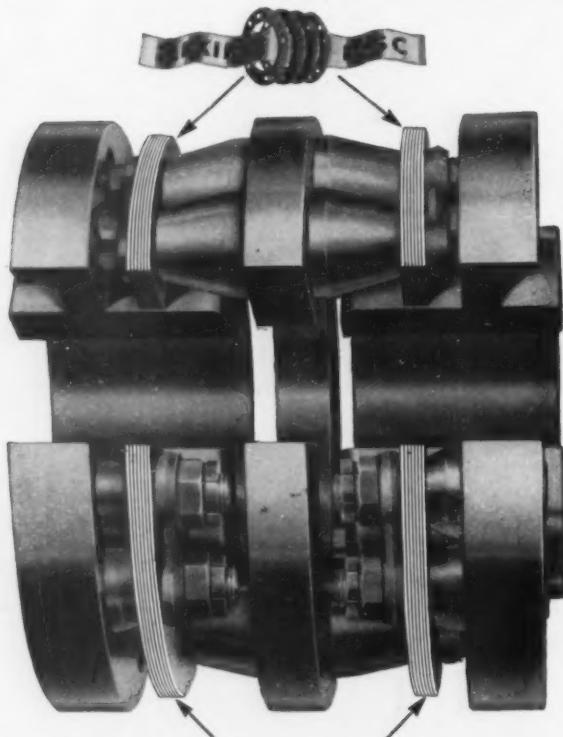
CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

AVOID COSTLY SHUT-DOWNS!

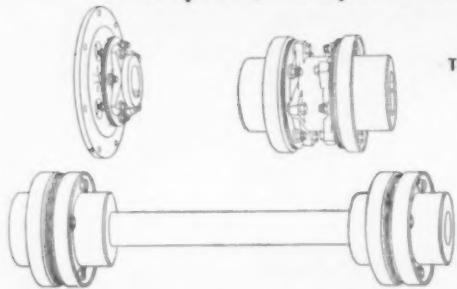
Specify THOMAS Flexible Couplings for Power Transmission

DISTINCTIVE ADVANTAGES of THOMAS ALL-METAL COUPLINGS	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
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CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
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Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes.



THE THOMAS PRINCIPLE GUARANTEES
PERFECT BALANCE UNDER ALL
CONDITIONS OF MISALIGNMENT.

MANUFACTURERS OF
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FOR OVER 35 YEARS

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THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

—Free Publications—

Continued

Precision grinders

A new line of precision surface grinders for tool room and production grinding operations is described in a 20-p. catalog by DoALL Co. One of the models described is the company's D6 Tool Room Surface Grinder, now available with a considerable larger work area. Notable in the listing of attachments designed by DoALL to expand the versatility of grinders are units which adapt the grinders to automatic operation for plunge form grinding or surface grinding. *DoALL Co.*

For free copy circle No. 13 on postcard, p. 87.

Automatic time switch

Heavy-duty time switches for automatic control of street lighting, store windows, signs, refrigerator defrosting, and many industrial applications are listed and illustrated in a bulletin recently issued by the General Electric Co. Dimensions and pricing data are also provided. *General Electric Co.*

For free copy circle No. 14 on postcard, p. 87.

Polyester resins

A booklet entitled *Bakelite Polyester Resins for Reinforced Plastics* includes production methods, formulations and properties of Bakelite polyester resins. Mass produced one-piece car and truck bodies, prefabricated housing and 100-ft light cargo vessels are a few of the large molding applications made possible by recent improvement of polyester resins. *Bakelite Co.*

For free copy circle No. 15 on postcard, p. 87.

Gadgets

A book of gadgets has been published by the Petroleum Chemicals Div. of the Du Pont Co. For the most part, the gadgets described are not commercially available but were designed by individual machine shops to solve specific production and safety problems. However, a few of these units were in such demand that independent manufacturers have produced and marketed them. *E. I. Du Pont de Nemours & Company, Inc.*

For free copy circle No. 16 on postcard, p. 87.

STEEL PROBLEMS?

One call gives you ALL the answers!



Delays are costly. When a business is faced with a problem, it is to its advantage to solve it quickly and maintain production rates. Of course—in this age of mass production, specialists, and far-flung operations—that isn't always possible. But Weirton, with a full appreciation of the importance of its customers' problems, has integrated all operations to provide time-saving answers.

At Weirton, key men who may be needed for decisions on prices, quantities, metallurgy, deliveries, or other problems are within quick reach of one another. Sales, laboratory, production, shipping—all departments are "under one roof" to cut delays to a minimum when customers need quick action.

This method of operation was established for your benefit. When you are faced with a steel problem, pick up your phone and get all the answers quickly . . . from Weirton.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

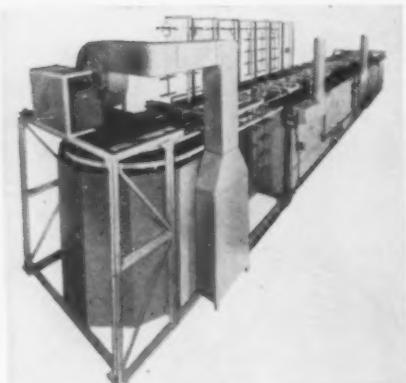


NATIONAL STEEL CORPORATION



NEW EQUIPMENT

New and improved production ideas, equipment services and methods described here offer production economies . . . just fill in and mail the postcard on page 87 or 88.



New electroplating machine features automation

A fully automatic electroplating machine has no elevating super structure, no transfer cams, no chains or sprockets and no hydraulic fitting above the tanks. The transfer and conveying principle, around which the machine is built, has but two reciprocating movements, longitudinally and vertically. Working parts are mounted on a central carriage that supplies the

horizontal motion to the work through the cleaning and plating tanks. Work lifting arms provide the vertical motion which lifts and lowers the work out of and into the tanks. Synchronizing these movements provides the complete transfer of work through all operations back to the loading station for removal. *Wagner Brothers, Inc.*

For more data circle No. 17 on postcard, p. 87.



Boring machine for mass production or small lots

This 998 boring machine is for precision boring, precision drilling, straight or contour turning and boring, facing and grooving especially where fine finish and high production are desired. Designed for consistent accuracy, it can be tooled either as a single purpose machine for quantity production or for miscellaneous work in small lots. Because it is an all-mechanical machine, its cycle once set up is positive and constant. Smooth, uniform motion of the table and

freedom from vibration are assured by the 998. Bed, bridge, heads and table are Meehanite castings. Cams and change gears are easily accessible for changing either the length of the stroke or the rate of travel. Table measures 17½ x 22 in.; has three ½-in. T slots that handle a wide variety of fixtures. Design of the 998 takes full advantage of standard purchased parts. Low or high pressure coolant systems are available. *Bryant Chucking Grinder Co.*

For more data circle No. 18 on postcard, p. 87.



Metal remelter has automatic loader

Improved metal remelter and meltevator, an automatic loading device which renders the remelting operation almost entirely automatic, is a self-contained unit for remelting of soft metals such as babbitt, solder, tin, zinc, lead and lead alloys. The bottom-pouring spout, loading cover and accessories such as power agitator, hand pumps, water-cooled ingot molds, loading device, etc., may be located on either side, or rear to meet special requirements. Standard unit is complete and compact, equipped

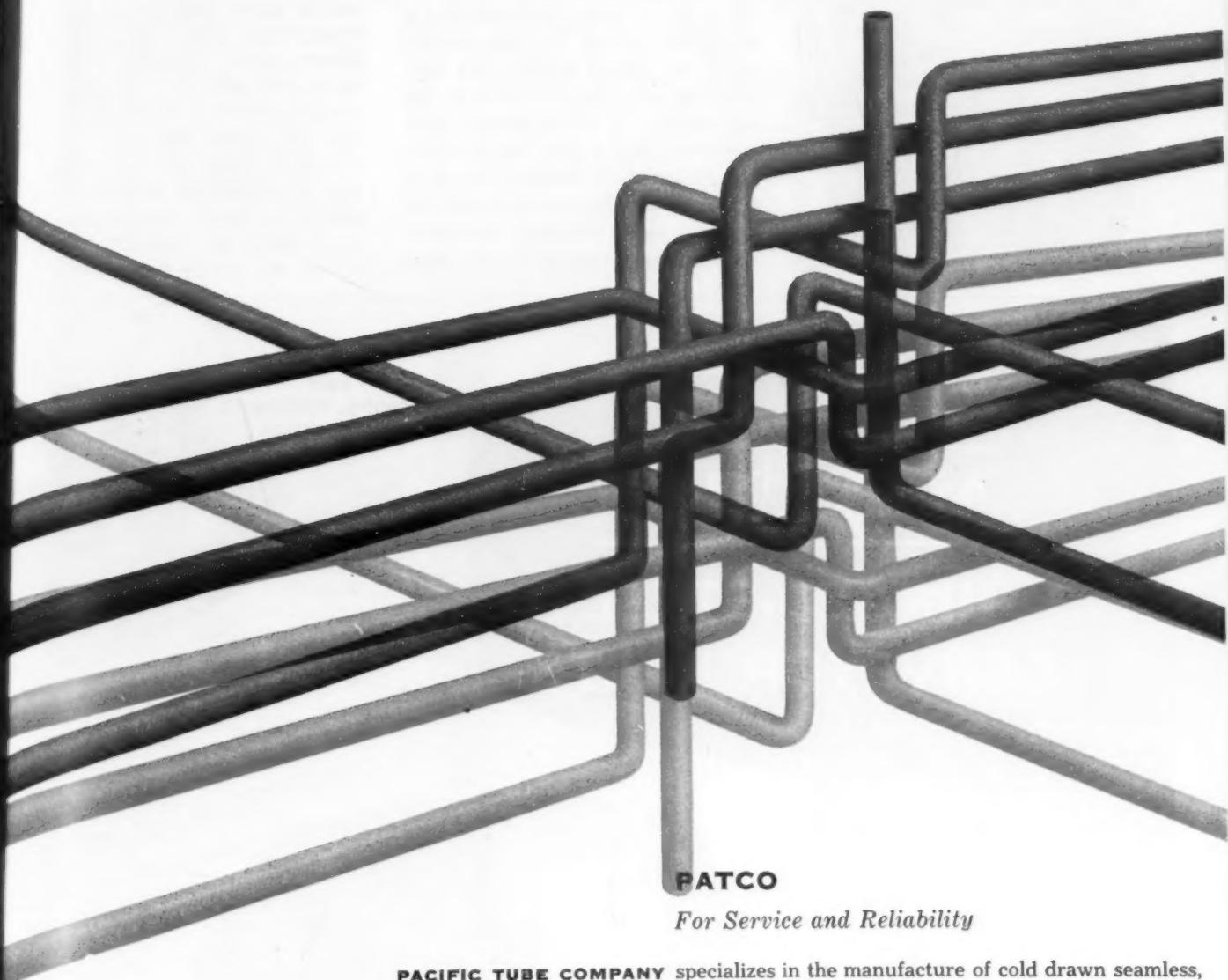
with hinged cover, ventilating pipe connection, bottom draw-off valve with swing spout and heating equipment. Heating can be by electricity, oil or any type of gas desired. Although regularly furnished for temperatures up to 850°F, these furnaces may be equipped to give any necessary temperature up to 1000°F. Standard models are available with pot capacities from 600 to 5 tons. *Nolan Corp.*

For more data circle No. 19 on postcard, p. 87.

Turn Page



THE LIFE BLOOD OF INDUSTRY FLOWS THROUGH STEEL TUBING!



PATCO

For Service and Reliability

PACIFIC TUBE COMPANY specializes in the manufacture of cold drawn seamless, welded and drawn, resistance welded tubing and cold drawn bars. Write for our catalog.

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West Coast Representatives for Superior Tube Company, Norristown, Pa., manufacturers of fine small tubing.

New Equipment

Continued



Horizontal shaving machine for precision gears

Model GCK-96 Red Ring horizontal precision gear shaving machine for spur, helical and herringbone gears from 2 to 16 diametral pitch having pitch diameters from 24 to 96 in. has been improved. Two cutter heads speed herringbone gear shaving operation; rapid traverse feeds on both heads reduce setup time, and redesigned controls facilitate

machine operation. The machine is equipped with a flexible work driver and adjustable bearing pedestals which permit large gears to be shaved by the rotary crossed axes principle while mounted on their journal bearings as they will run in the equipment installation. *National Broach & Machine Co.*

For more data circle No. 20 on postcard, p. 87.



Checks involutes, tooth spacing of large gears

A Sine-Line involute checker can handle large spur or helical gears up to 36 in. pitch diam and has a maximum spread between centers of 26 in. Rapid reading and easy charting are characteristics of the equipment. A single master disk, combined with a sine bar, provides the proper ratio between the master disk and the base diameter of the gear being checked. A removable bracket attached to the indi-

cator head holds fingers for checking tooth spacing. Both spur and helical gears can be checked on Model 1136, with checking of the latter gears performed either in the normal or transverse plane. Internal gears can also be checked on the Sine-Line machine. Where automatic, fast, accurate checking and a permanent record are required the MTR recorder may be used. *Michigan Tool Co.*

For more data circle No. 21 on postcard, p. 87.

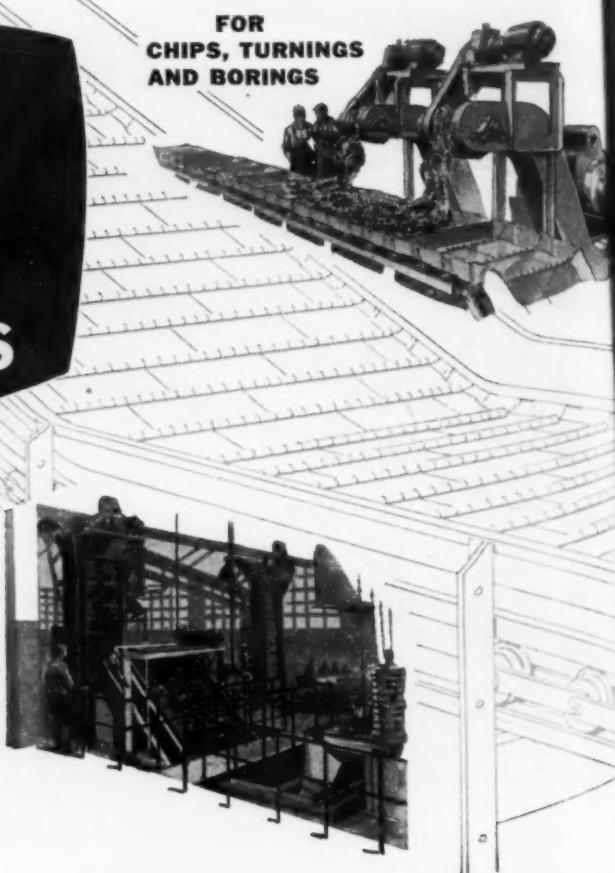
MAY-FRAN

HINGED-STEEL CONVEYOR BELTS

Diagram shows assembly of links, rollers, chain and side wings.

FOR CHIPS, TURNINGS AND BORINGS

FOR MASS-PRODUCED PARTS



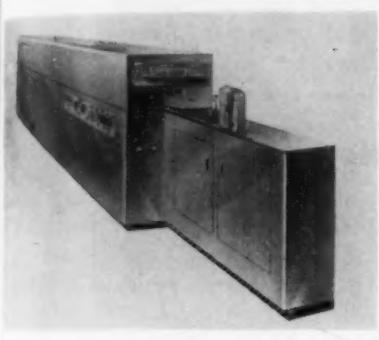


Shell molding machine makes 2 shells per minute

Featuring dual dump boxes and choice of gas or electric curing oven, the new HO-4 shell molding machine increases output and uniformity of molds. Rated at two shells per min, the unit is available with automatic timers for both inversion and curing cycles. New dump box design facilitates even sand fall to increase uniformity and compactness of shells. Automatic dump box clamps, counter-balanced

pattern frame and dump boxes, sealed ball bearings throughout, positive air-actuated shell ejection, thermostatically controlled pattern temperature, and heat-resistant permanently bonded silicone dump box seals are standard features. Castings with tolerances as close as 0.005 in. per in. are claimed to be obtainable from Shalco shell molds. *Shalco Engineering Corp.*

For more data circle No. 22 on postcard, p. 87.



Spectrograph offers high dispersion and resolution

Special advantages in analyzing isotopes, in the study of line shapes, or in any analysis problem involving high dispersion or low concentration are offered by a new plane grating spectrograph. The instrument is completely stigmatic and has been developed to produce ultra-high dispersion and resolution while covering 2000A to 6500A

at a single setting. Theoretical resolving power of the spectrograph ranges from 75,000 in the first order to 600,000 in the eighth order. Standard model has 20-in. plateholder. It has pushbutton controls for shutter, wavelength and plate racking mechanisms. *Jarrell-Ash Co.*

For more data circle No. 23 on postcard, p. 87.

Turn Page



FOR
PRESS SCRAP

Speed up your production with a MAY-FRAN automatic handling system. CHIPS, TURNINGS AND BORINGS are continuously and automatically removed from operating machine tools with MAY-FRAN CHIP-TOTES. These outstanding units speed production by eliminating machine down-time for manual scrap removal. MAY-FRAN Conveyors can then transmit scrap to ultimate point of disposal.

PRESS SCRAP systems can be made completely automatic. MAY-FRAN Conveyors take scrap from presses, handle it through shearing and baling processes, and deliver it to railroad cars.

MASS PRODUCED PARTS can be handled automatically on MAY-FRAN Conveyors through heat treating, machining, inspection, and other operations with maximum trouble-free speed and efficiency.

Write today
for detailed
information

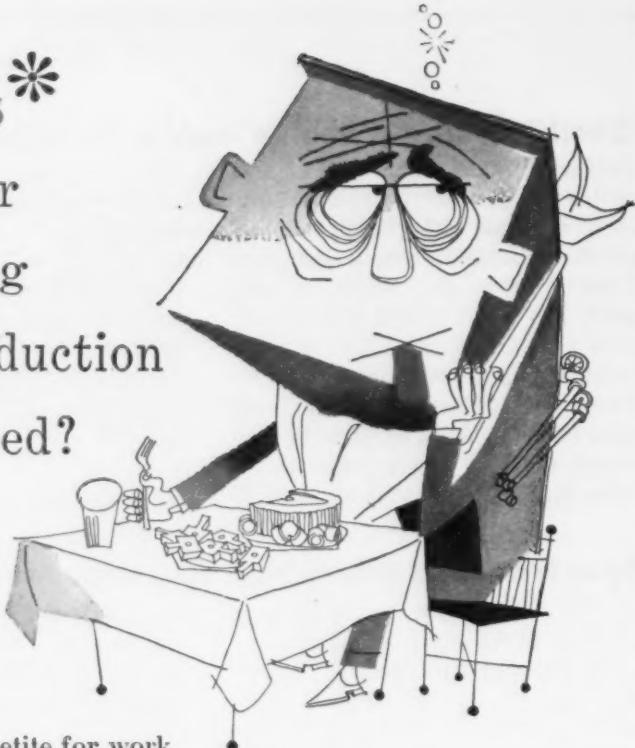
MAY-FRAN
ENGINEERING, INC.

DESIGNERS AND BUILDERS OF
COMPLETE HANDLING SYSTEMS

1698 CLARKSTONE ROAD • CLEVELAND 12, OHIO

1486-MP

does
coil-it is*
 have your
 processing
 tank production
 off its feed?



When the appetite for work
 of your heating and cooling processes
 diminishes, the trouble may well be coil-it is. For,
 downtime due to pipe failures and limitations can
 seriously delay your production flow. Switch to Platecoils, the
 new tonic for production, as revolutionary as the new
 wonder drugs. Platecoils take 50% less tank space leaving more
 room for greater payload. They heat or cool 50% faster.
 They simplify maintenance and save hours of downtime.
 Equally important, Platecoils cost as much
 as 50% less in the first place.
 Platecoils cure production troubles involving heat
 transfer and give production a shot in the arm.

Write for Bulletin P73 today!

PLATECOILS SAVE 50% IN HEAT TRANSFER COSTS

**PLATECOILS ELIMINATE
 A 6-TO-8 HOUR-A-DAY
 CHIPPING JOB**



At Sealed Power Corp., installation of Platecoils has completely eliminated a 6-to-8 hour-a-day chipping job. Three Platecoils now heat a tank that previously took 4 pipe coils. Ask about other case histories.

PLATECOIL **REPLACES PIPE COILS**



Coil-it is — Diagnosed
 as tank heating and
 cooling problems.
 Platecoils — the
 prescription for solving
 pipe coil problems.

PLATECOIL DIVISION, TRANTER MANUFACTURING, Inc., LANSING 4, MICHIGAN

New Equipment *Continued*

Carbide tools

Eleven styles of single point standard carbide tools comprise an available new line. They have finished diamond ground cutting edges and are manufactured in accordance with the strictest standards in the industry. Available in styles AL, AR, BL, BR, C, D, E, FL, FR, GL and GR, the tools have color coded shank markings, and come in grades for cutting steel, cast iron and non-ferrous materials. These silver solder brazed tools have rugged cold drawn steel shanks and the cutting edges are plastic dipped for added protection. *Adamas Carbide Corp.*

For more data circle No. 24 on postcard, p. 87.

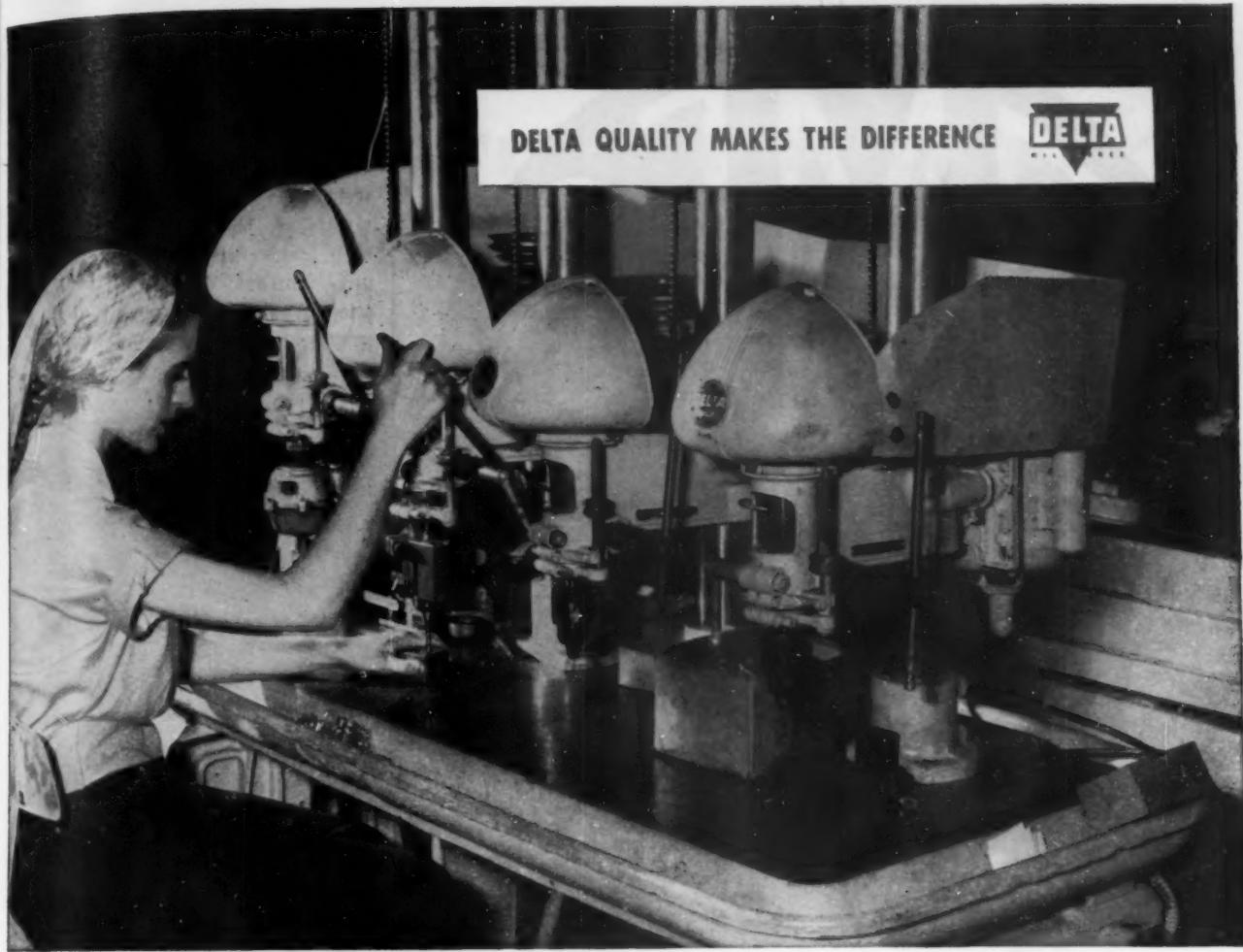
New undercarriage

A new heavy duty undercarriage specifically designed for providing a solid foundation to withstand the stresses of crane operation is being built for the Model 1520 self-propelled mobile crane which is rated $\frac{3}{4}$ yd with lifting capacity up to 20 tons. The all-welded undercarriage provides maximum stability in the handling of extremely heavy



loads. A double beam arrangement of the walking beam principle provides for maximum support for the wheel spindles. Each wheel carries its proportionate load without transfer of weight from one axle to another. This eliminates distortion of the tandem rear axles and also assures maximum traction over uneven surfaces. *Unit Crane & Shovel Corp.*

For more data circle No. 25 on postcard, p. 87.
Turn Page



One Operator Plus One DELTA Set-Up

HOLLOW MILLS, DRILLS, TAPS AND COUNTERSINKS AT SKILLMAN HARDWARE

More pieces per hour with less labor cost—that's what Skillman Hardware Manufacturing Co., Trenton, N. J., gets by locating inexpensive Delta tools in groups so that related machining operations can be done by a single operator.

Though Delta tools are inexpensive, they are production machine tools—as accurate as tools costing many times as much.

Here's the testimony of John Strasenburgh, Skillman production foreman: "Of course, since we build locks, our precision standards are very high, and we work as close as .0005", but our Delta tools are accurate, dependable and easy to operate."

These are some of the ways Skillman groups Delta tools:

- ... two Delta drill presses side by side; one drills, the other taps.
- ... three Delta drill presses together to drill, tap and counter sink.
- ... four Delta drill presses—to hollow mill, drill, tap and counter sink.
- ... two 17" Delta drill presses mounted on single column with opposing spindles drilling and reaming same hole in one set-up.

Light, mobile, dependable Delta tools are easily adapted to hundreds of production jobs. There's a wealth of such performance data available to you. Ask your Delta dealer—he's in your Classified Phone Book under "Tools," "Machinery" or write for Catalog AB52 to Delta Power Tool Division, Rockwell Manufacturing Co., 640K N. Lexington Ave., Pittsburgh 8, Pa.

DELTA quality power tools
Another Product of **Rockwell**

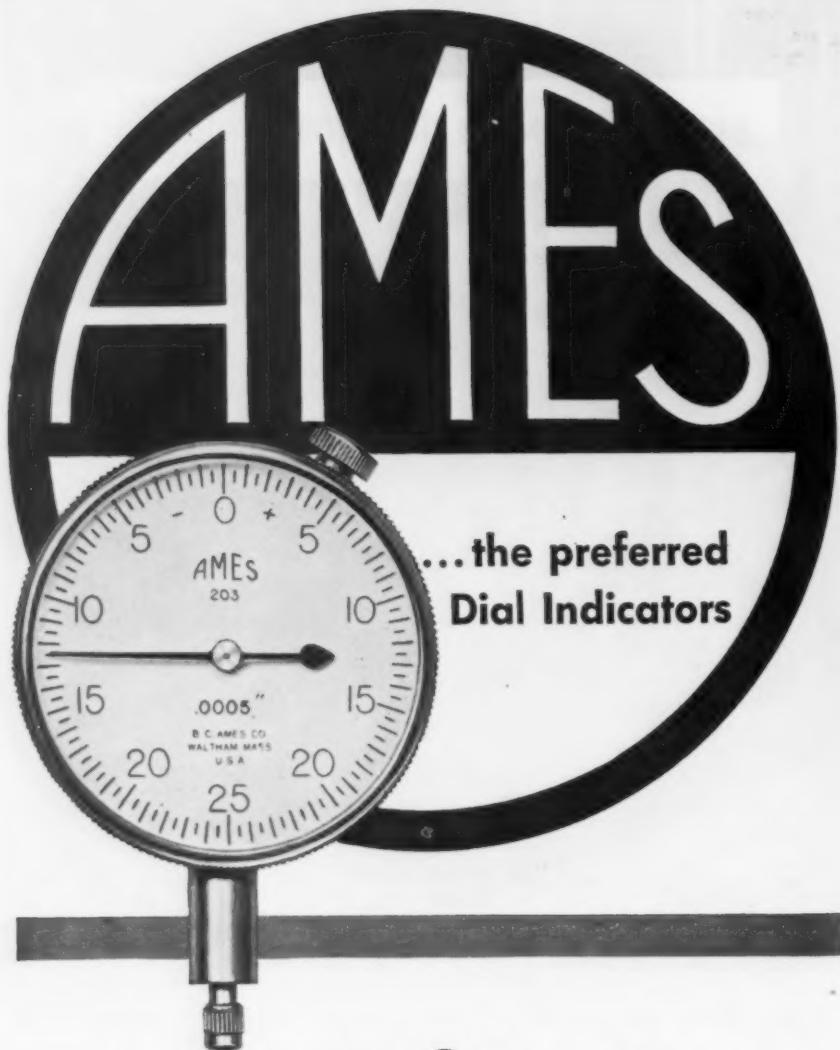


New Equipment

Continued

Comfort heaters

Sheet metal workers at a middle-west steel warehouse are kept warm right at their shearing job by means of Chromalox electric radiant comfort heaters. Five compact heating units mounted on the presses, focus gentle heat on hands and feet of three operators. With



One of America's largest and most famous mass-producers recently chose Ames as preferred source of supply for indicator gauges.

The reasons behind this decision are the very reasons why you should standardize on Ames dial indicators and dial gauges:—the Ames "Hundred Series" indicators available in four sizes, fit every measuring requirement; they are accurate, sensitive, low in friction, yet are rugged and tough—give more on-the-job time. All Ames products embody latest design and highest-quality materials; they are manufactured by methods and machines that are exclusive with B. C. Ames Co.

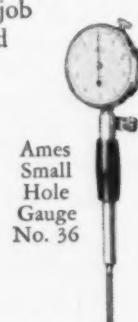


Ames
Dial Depth Gauge
No. 11C



Ames
Dial Micrometer
No. 517

Ames
Amplifying
Dial Comparator
No. 26



Ames
Small
Hole
Gauge
No. 36

Send today for your free copy
of Catalog No. 58

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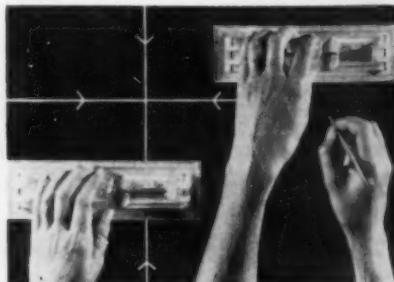
Mfr. of Micrometer Dial Gauges • Micrometer Dial Indicators

the radiant heaters, heat is aimed at the exact spot where it's needed. The company reports operating cost of the electric heating method is less than cost of coal and scrap wood used in salamanders for the same purpose. There is little waste, and radiant head cuts right through drafts. *Edwin L. Wiegand Co.*

For more data circle No. 26 on postcard, p. 87.

Glide rule

For drawing dexterity, the Glide-Rule, capable of rolling in two directions, combines important engineer's tools in one: triangles, T squares, straight edge, scales, pro-



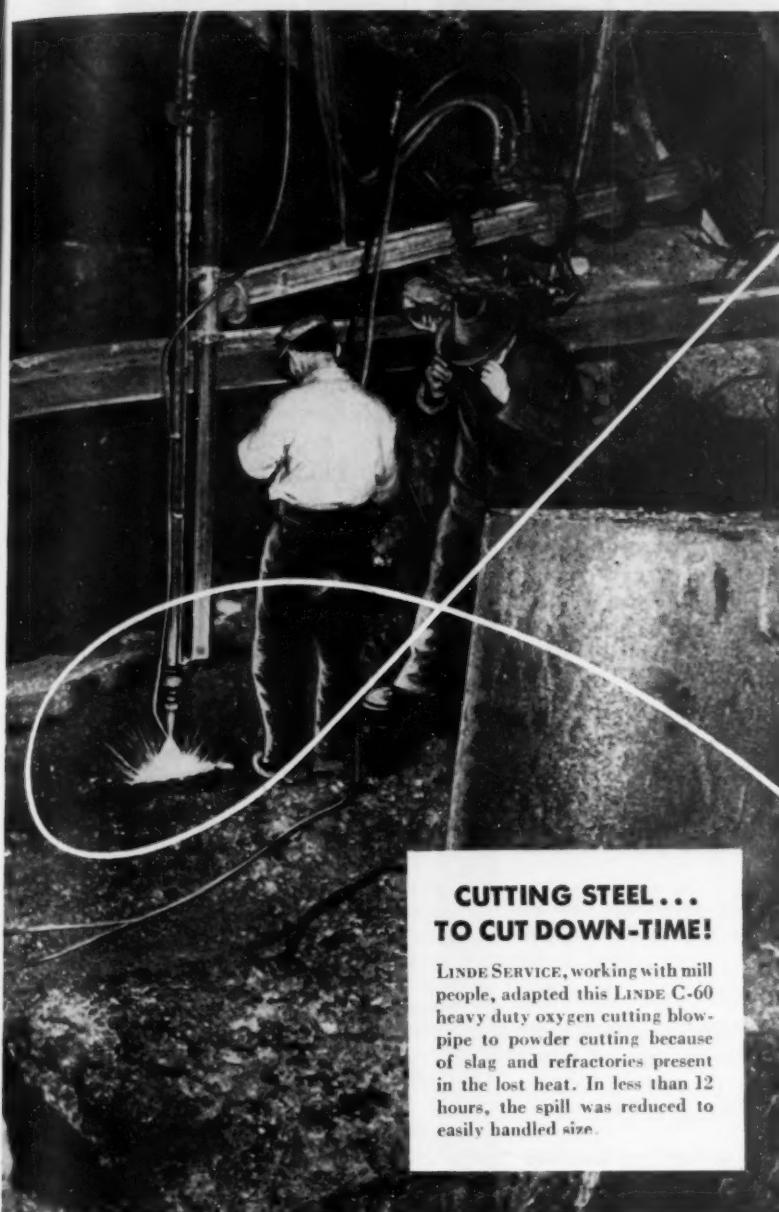
tractor and parallel rules. It is a pocket-portable drafting machine made of transparent plastic. A small thumb button permits the user to change direction and roll the Glide Rule quickly and easily to the desired position. *Smith Drake Corp.*

For more data circle No. 27 on postcard, p. 87.
Turn Page

How Oxygen...and LINDE SERVICE*

HELPED REMOVE A "LOST HEAT" OF STEEL

IN A DAY... INSTEAD OF MONTHS



CUTTING STEEL... TO CUT DOWN-TIME!

LINDE SERVICE, working with mill people, adapted this LINDE C-60 heavy duty oxygen cutting blowpipe to powder cutting because of slag and refractories present in the lost heat. In less than 12 hours, the spill was reduced to easily handled size.

Tons of molten steel, pouring through a breakout in an open hearth furnace, settled in the furnace pit.

The last time a heat was lost, the mill had to wait three months for special equipment to remove the huge spill. That meant costly delay in repairing the furnace and a floor cluttered with a mass of steel.

This time, however, the mill management called in LINDE SERVICE to help. LINDE engineers recommended bringing in a LINDE heavy duty oxygen cutting blowpipe that was operating in the mill's scrap cutting yard. A temporary fixture was built, and in less than 12 hours the lost heat was cut into sections that were easily removed to the scrap yard. The furnace was repaired and back in operation in record time, producing steel that would otherwise have been lost.

* LINDE SERVICE

is the unique combination of research, engineering, and over 40 years of accumulated know-how that is helping LINDE customers save money and improve production in their uses of oxygen and oxy-acetylene processes.

If you use oxygen in your operations, LINDE SERVICE can mean dollar savings to you. Let us tell you more about it.

LINDE AIR PRODUCTS COMPANY

A Division of UNION CARBIDE AND CARBON CORPORATION

30 East 42nd Street  New York 17, N.Y.

Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto



a special message
for manufacturers of
automotive equipment

need a finish for low cost
corrosion protection or
showroom sparkle? specify **IRIDITE**

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WEST COAST INCORPORATED, I. M. Butcher Co.

New Equipment

Continued

High speed tool steel

Production of high speed tool steels of regular analyses, to which has been added uniformly-distributed sulphide lubricants in a new form, has been announced. And it is claimed that longer tool life will result from the use of the new X.L. steels. They are available in M-1, M-2 and M-10 types and in all of the sizes and shapes in which these types are normally furnished. *Latrobe Steel Co.*

For more data circle No. 28 on postcard, p. 87.

Electric impact hammer

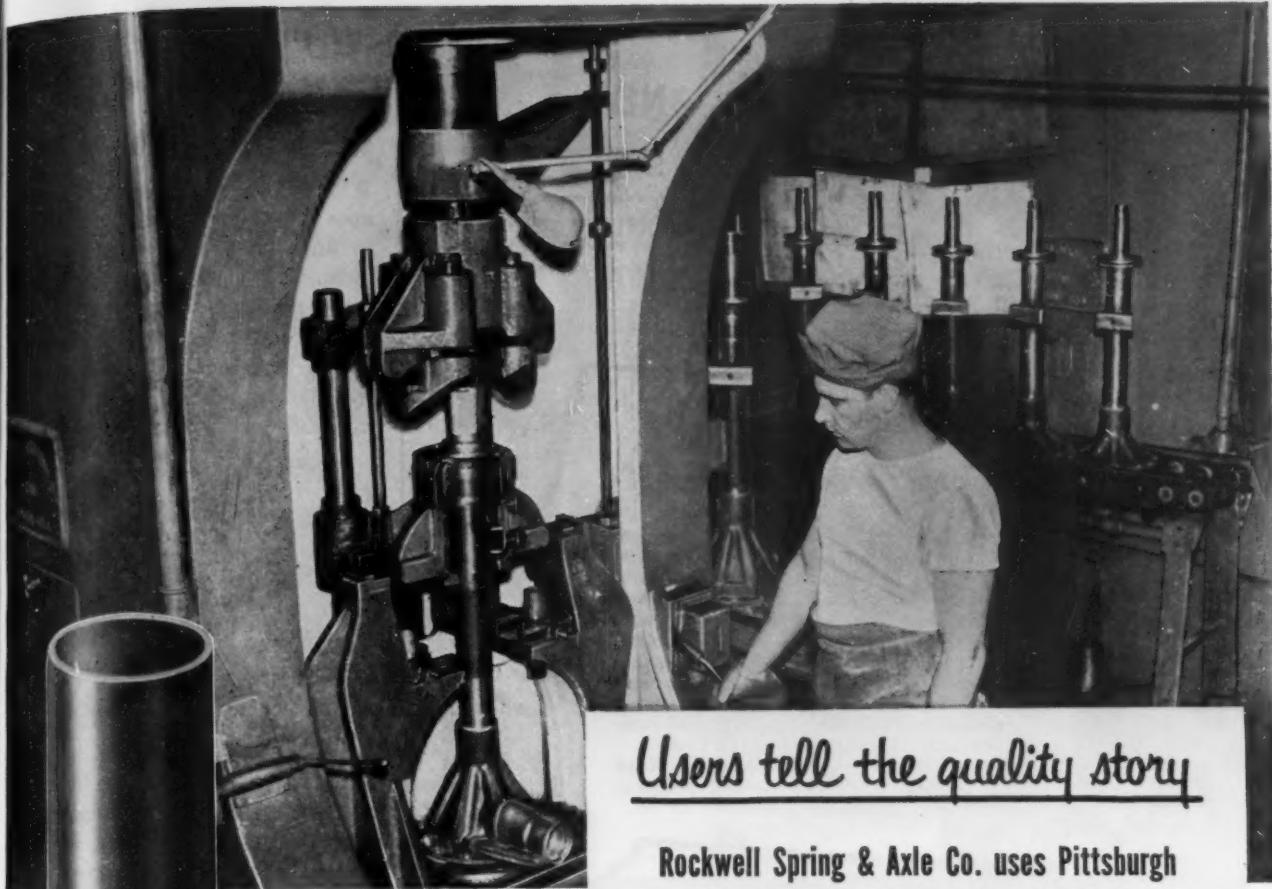
This heavy-duty electric impact hammer is capable of delivering impacts adjustable from a few pounds to 10,000 lb at rates up to 75 blows per min. It can be used for heavy-duty staking, crimping, punching, forming, riveting, stamping, marking, etc. The Electro-



punch operates on the electromagnetic principle, deriving its power from a specially designed solenoid. A selenium rectifier is used to transform ac to dc, achieving greater operating efficiency. Model C operates by a momentary contact hand, foot or automatic switch, or automatically with a limit switch, when work is inserted under the ram. Power head is adjustable to and from work. *Black & Webster, Inc.*

For more data circle No. 29 on postcard, p. 87.

Turn Page



Users tell the quality story

**Rockwell Spring & Axle Co. uses Pittsburgh
Steel Seamless Tubing for strong,
safe, durable rear axle housings for trucks**

In light panel trucks, built to stand up day-in and day-out under the most severe punishment, every part must be skillfully designed and precision-made from the finest materials to give the longest possible service.

The tubular steel housings running from differential to rear wheels are typical of the care and precision put into axle building by the Rockwell Spring & Axle Co. plant at New Castle, Pa. These housings not only protect the axles that transmit the power to the rear wheels but carry the truck's combined body weight and load as well.

Mr. Peter P. Dziki, Rockwell metallurgist, says, "The specifications for the steel in these housings were carefully drawn

to meet Rockwell's rigid axle requirements for great resistance to bending as well as the effect of severe brake application. Pittsburgh Steel Seamless Hot-Rolled Tubing meets the specifications perfectly. Specially designed welding machines electrically butt-weld forged steel spindles to the seamless tubular section. Since this butt-weld is guaranteed for life, the welding quality of the steel is of paramount importance. Pittsburgh Steel Seamless Tubing fills the bill."

If you use seamless steel tubing in the manufacture of your product, the men in Pittsburgh Steel's tube division would like to tell you what they can do for you. Write Department IA, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Seamless Cold Drawn Tubing

a product of Pittsburgh Steel Company
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IOWA DEVELOPMENT COMMISSION

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A FORGING PRODUCER writes, "Up to a quarter-million pounds of steel moved in an 8-hour day."

"KRANE KAR," a BALL BEARING MFR. says, "unloaded 50 tons of tubing from a box-car and transferred same to truck in 3 hours."

Another MANUFACTURER: "Simplified our materials-handling . . . saved us \$3824.24 in 8 months."

ADDITIONAL CASE HISTORIES IN ILLUSTRATED BUL. #89

*MATERIALS-HANDLING

Gas or diesel; 9 to 37 ft. booms or adjustable telescopic booms; solid or pneumatic rubber tires.



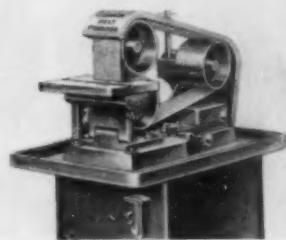
SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

New Equipment

Continued

Carbide tool finisher

With a new finishing machine that uses abrasive belts it is possible to final-finish single point carbide tools. It features tungsten carbide faced platen permitting the finishing of end, top and side clearance angles. One setting is used for all size tools and belts can be changed without disturbing the setting.

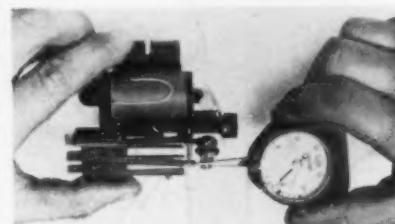


Using abrasive belts in place of diamond wheels means a low cost initial investment. It also eliminates risk of substantial loss due to damage to diamond wheels. The finishing machine can be used also for sharpening tools made from high-speed steel and for miscellaneous grinding and sharpening operations. *Hammond Machinery Builders, Inc.*

For more data circle No. 30 on postcard, p. 87.

Precision dynamometer

New precision dynamometer is an aid to the inspector or engineer in determining and checking the pressure required to overcome spring tension and other kinds of resistance in fine precision mech-



anisms. Applications can be found in almost every field of industry where uniformity of pressure, starting torque or spring tension are necessary to insure proper functioning. Two models, small and large, are available each in several ranges in grams of pressure, acting in both directions. *George Scherr Co.*

For more data circle No. 31 on postcard, p. 87.

The Iron Age

SALUTES

Russell F. Hall

He brought his company from decline to success by his belief in southern industrialization.



THE South has a way of rewarding those who have faith in it. Russell Hall has never doubted its potentialities. In 1931 he moved his family from Oregon to North Carolina and started as a dealer in municipal bonds. That the bonds of nearly every political subdivision were in default didn't discourage him.

Russ also has the ability to make others see the rich opportunities in the South. Many Southerners are richer today thanks to the bonds he recommended.

In 1937 he bought control of Wysong & Miles Co., Greensboro, N. C., wood-working machinery plant with six employees and no orders. Three years later Russ gave up a profitable bond business to develop a growing Wysong & Miles.

During World War II Wysong produced shells, fuzes and machines for the government. After the war Russ led his company into the highly competitive industrial market for metalworking machines. Under his guidance Wysong soon became known as one of the leading manufacturers of sheet metal machinery.

Wysong also developed an automatic, hydraulic stroke sander and automatic dovetailers for the woodworking field. The company has grown from 6 workers to over 200, has annual sales of over \$3 million.

It's only natural that a man like Russ would be active in community affairs. He's served as president of the Greensboro Chamber of Commerce and as an official of various farm organizations. And if you think the South raises only cotton, Democrats and tobacco, get Russ to show you his 3800-acre ranch. You'll see some of the slickest Herefords this side of a sizzling steak platter.



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SS-77

The Iron Age

INTRODUCES

E. A. Smith, appointed vice-president and manager of two export sales subsidiaries Koehring Inter-American Co. and Koehring Overseas Co., KOEHRING CO., Milwaukee.

T. E. Alwyn, vice-president, elevated to the Executive Dept. where he will work directly with other principal executive officers in the overall administration, AMERICAN CAN CO.; and D. B. Craver, elected vice-president in charge of sales.

Dr. William F. Waldeck, promoted to director of research and development, WYANDOTTE CHEMICALS CORP., Wyandotte, Mich.

Dr. C. L. Wrenshall, appointed associate director, Technical Service Dept., CHAS. PFIZER & CO., INC.

Raymond A. Thon, appointed director of Quality Control, Rochester Products, Div. of GENERAL MOTORS CORP.

Leonard A. Johnson, appointed comptroller, STERLING-ELECTRIC MOTORS, INC., Los Angeles.

Dr. R. M. Lacy, appointed technical director, MICHIGAN CHROME & CHEMICAL CO., Detroit.

William T. Burns, appointed assistant general superintendent, Natividad dolomite and Moss Landing refractory and magnesia plants; KAISER ALUMINUM & CHEMICAL CORP., Chemical Div., Oakland, Calif.; and Jack D. Moore, named superintendent, Moss Landing magnesia plant.

David W. R. Morgan, appointed to the headquarters staff, WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

William J. Meakin, elected executive vice-president, R. B. CAROLIN FOUNDRY & MACHINE CO., Detroit.

Ernest B. Lawton, Jr., appointed sales supervisor, Screw Machine Products Div., SCOVILL MANUFACTURING CO., Waterbury, Conn.

A. M. Caito, has been appointed works manager, Maple Grove and Bettsville, Ohio, operations, BASIC REFRactories, INC.

Nelson C. Devilling, has been appointed abrasive engineer for central Illinois, BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

Garland C. Raines, appointed manager of publications, DRAVO CORP., Pittsburgh.

H. W. Uhl, appointed manager of fleet sales, Sales Div., Kaiser-Willys, WILLYS MOTORS, INC., Toledo.

Clarence E. Killebrew, appointed manager for marketing and sales, CLARK EQUIPMENT CO.

F. E. Leib, promoted to manager of sales and Wire & Cable Div., COPPERWELD STEEL CO., Glassport, Pa.

William Harvey III, appointed manager of branch operations, Motors Holding Div., GENERAL MOTORS CORP., New York.

Wells A. Gardner, appointed works manager, AMERICAN BLOWER CORP.

Forest S. Burtch, appointed product sales manager, newly formed Construction Materials Dept., JOHN A. ROEBLING'S SONS CORP., a subsidiary of the Colorado Fuel & Iron Corp.



J. C. LINSEMAYER, elected president, American Blower Corp., Detroit. A division of American Radiator & Standard Sanitary Corp.



E. L. CASEY, appointed vice-president Operations Scaife Co., Oakmont, Pa.



BEN SNYDER, appointed sales engineer, Dayton, Ohio office, E. W. Bliss Co., Canton.

Personnel

Paul W. Rice, appointed manager, TRUEHAUF TRAILER CO., Branch Factory, Greensboro, N. C.

Bernard A. Chapman, appointed manager of manufacturing, NASH-KELVINATOR CORP., Detroit.

Athos D. Rossi, appointed sales manager, Eastern Div., CONTAINER STAPLING CORP., Herrin, Ill.

John N. Schwaller, appointed advertising and sales promotion manager, CLEVELAND WELDING CO., subsidiary of American Machine & Foundry Co., New York.

Robert M. Gordon, appointed sales manager, THE TORRINGTON MANUFACTURING CO., Air Impeller Div., Torrington, Conn.

Joseph Swain, appointed assistant sales manager, HANCOCK STEEL CO., INC., Detroit.

Edward P. Fenlon, appointed sales and advertising manager, ALCONOX, INC., Jersey City, N. J.

Robert R. Sheffer, appointed regional sales manager, THE GALION ALLSTEEL BODY CO., Ohio, West Va., Mich., Western Pa. and Western New York territory.

Gordon W. Rowand, appointed assistant sales manager, LINK-BELT SPEEDER CORP., Cedar Rapids, Iowa.

K. J. Kettner, appointed district manager, THE RAMTITE CO., Chicago.

John M. Manypenny, named Eastern district manager, BECKMAN INSTRUMENTS, INC., South Pasadena, Calif.

Roland Whithurst, appointed general manager, Industrial Products Div., THE ELECTRIC STORAGE BATTERY CO., Philadelphia.

Henry V. Armagnac, appointed district manager, Middle Atlantic Region, LEWIS-SHEPARD PRODUCTS, INC.



MAX B. MENTLEY, elected vice-president-Manufacturing, National Broach & Machine Co., Detroit.



BEN F. BREGI, elected vice-president-Engineering, National Broach & Machine Co., Detroit.

The manufacture of multi-product lines has always created problems for metal fabricators. While diverse metal sizes, shapes and perforations enhance product value and customer acceptance — they also add to manufacturing costs. In order to keep customers happy and keep production costs down, put Hendrick's specialized perforated metal facilities to work.

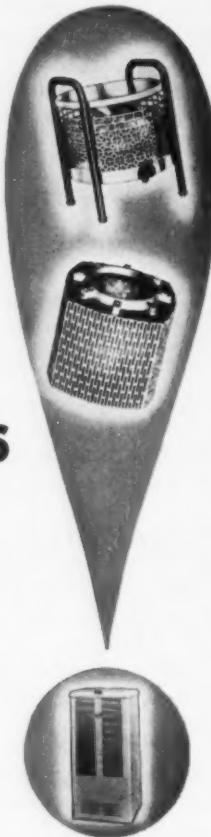
Your answer to fabricating problems

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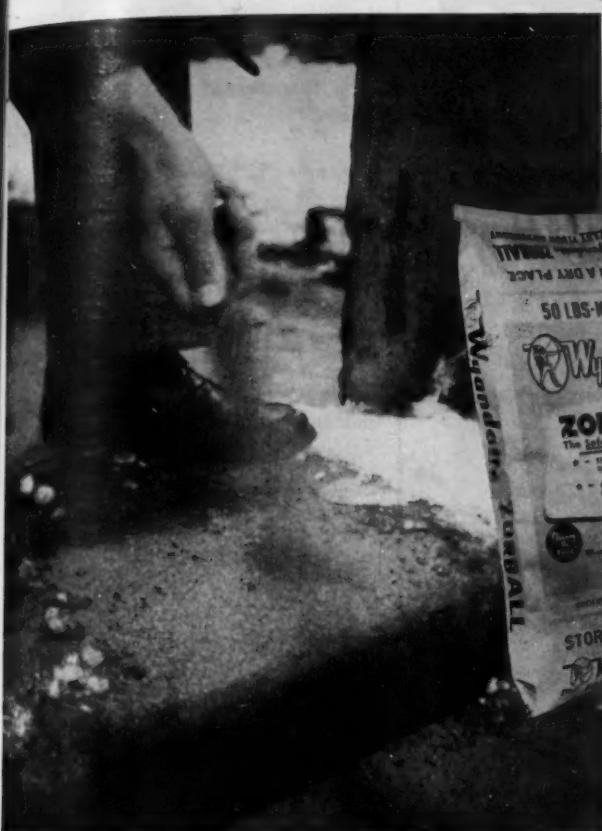


ROBERT M. WHITNEY, appointed manager, National Advertising and Promotion, The Yale & Towne Mfg. Co., New York.



JACK BEAUDOIN, promoted to assistant superintendent, Electrical Maintenance Dept., Kaiser Steel Corp.

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For ICY slippery surfaces!

ZORBALL will stop slipping, skidding—prevent accidents on steps, walks, loading docks, ramps, etc. You can use it, also, to stop skidding of autos, trucks, buses, material handling vehicles . . . in plants, drives, parking lots, etc.

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Wyandotte ZORBALL is a different and better floor absorbent. It won't BREAK DOWN, mud, dust or cake.

And, equally important, it continues to be skid-proof even after absorbing saturation quantities of oils, greases, paints, chemicals or water. In fact, after drying out, it can even be used again.

Zorbball is the most effective, lowest-cost floor absorbent you can buy. Endorsed by safety engineers and management alike.

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Send FREE sample of Zorbball for icy surfaces

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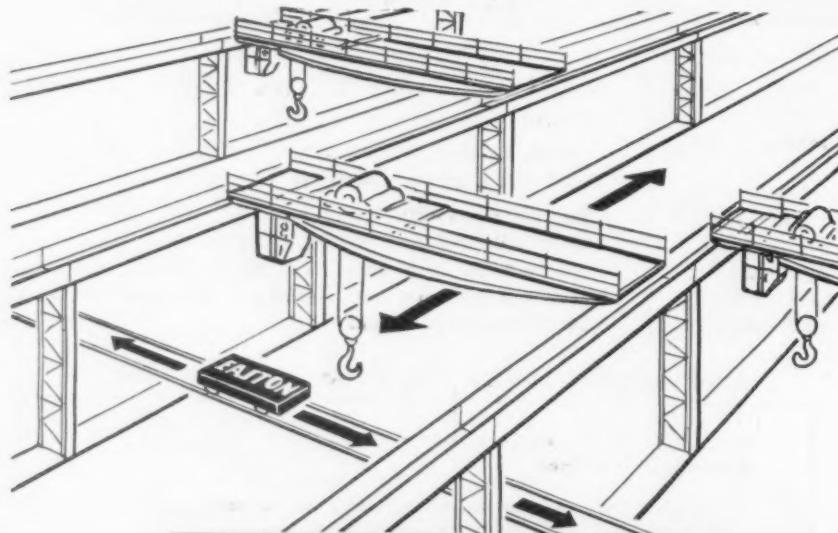
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EASTON

A-1041

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Personnel

Continued

Robert J. Bodeman, transferred to Chicago Sales office as a salesman, HARBISON-WALKER REFRAC-TORIES CO.; and Ernest C. Ullom, was transferred to New York sales office.

James L. Woodley, promoted to general service manager, HYSTER CO., Portland, Ore.

Thomas K. Wells, appointed general sales manager, FLEXONICS CORP., Maywood, Ill.

W. Alexander McCune, Jr., appointed general sales manager, NOR-TON CO. OF CANADA, LTD.

Raymond E. Hale, appointed resident manager, new Louisville, Ky. Warehouse, JONES & LAUGHLIN STEEL CORP., Pittsburgh.

Tom Richards, appointed representative, Cincinnati, ALLIED RESEARCH SALES CORP., a subsidiary of Allied Research Products, Inc.

M. E. Reiner, named division manager to direct activities of the Power Chemicals Div., E. F. DREW & CO., INC., New York.

R. M. Ellis, appointed special representative in Canada, Engine Div., THE NATIONAL SUPPLY CO., LTD.

J. D. McKinnon, appointed Detroit sales representative, COPPERWELD STEEL CO., Warren Div.

OBITUARIES

George F. Applegate, secretary and sales manager, Ajax Electro-thermic Corp., Trenton, N. J.

Richard W. Parsons, technical director, Ohio Brass Co., Mansfield, Ohio plant, after a long illness recently.

Herbert D. Tietz, 55, manager of sales, Inco Nickel Alloys Dept., The International Nickel Co., Inc., New York, suddenly.

Joseph E. Molamphy, 72, had been associated with the steel industry most of his life, recently, after a long illness.

CAST REFRactories

Lower Heat Treat Furnace Costs



By T. F. Keegan

Plant Engineer
Lansing Drop Forge Co.
Lansing, Mich.

♦ All-cast heat-treating furnaces offer the possibility of better balanced operation, low heat loss and high output . . . Elimination of brick construction results in substantially reduced overall costs and construction time.

♦ Repairs can be made easily if necessary, but eight months operating experience shows no flaking, spalling or cracking . . . Continuous annealing furnaces are operating 6 days per week at temperatures up to 1250°F.

♦ ADVANTAGES resulting from the use of cast materials—low labor cost and flexibility in design—have attracted the attention of furnace builders for more than 10 years. However, lack of construction and operating experience and the reservations of some engineers about the suitability of all-cast construction for production furnaces have undoubtedly retarded the use of cast refractory materials, even experimentally.

More than a year ago the decision was made by officials of Lansing Drop Forge Co. to go ahead with construction of two all-cast, continuous heat-treat furnaces. The furnaces were to operate at 1000 and 1250°F. Equipment was designed to handle 4500 lb of work per hr in regular production.

Construction of the 1000°F stress relief furnace was completed in just 3 weeks. A crew of only four workers was used. No bricklayers were required. Only one member of the construction crew had previous furnace building experience.

After the forms were built, the lower sidewalls were poured, using a standard cement mixer. The cast furnace material selected for the main furnace was Litecast 50 produced by General Refractories Co. Litecast 50 is purchased in 50-lb bags. A bag is sufficient for one cubic foot of furnace lining. After adding water and mixing, the material is ready for pouring.

Fig. 1 shows the furnace during construction. Litecast 50 walls and bottom are completed to the skew line of the main roof arch. Forms are in place for continuation of flues when the roof is poured. Insulating firebrick was used for the door arch to facilitate replacement in event of damage by stock.

Each furnace was poured in three sections with an interval of 12 to 24 hr between each pouring. As shown in Fig. 1, the first section poured included the bottom and sidewalls up to a maximum height of 27 in. Length of the furnace is approximately 23 ft. Wall thickness is 9 in. Litecast 50 is thermally more efficient than 2000° insulating firebrick.

Conveyor supporting rails were set in position on sidewalls after the first casting. Balance of

Metal reinforcements were not needed . . . This eliminated metal-refractory expansion problems.

sidewalls was cast around them. The second section poured brought the construction to total furnace height, exclusive of the fan chamber, aspirator, etc. Actual pouring of this section required about 8 hr.

The third and final section presented some special problems, both in designing the forms and pouring the cast refractory. Due to the complexity of this combustion chamber section, an insulating castable of higher refractoriness and greater structural strength was used. This is regular Litecast a 2300° insulating castable.

Fig. 2 shows the first of main roof forms in place. The Litecast 50 sidewalls shown extend below the rails. Litecast 50 was also used for the bottom of the furnace. Fig. 3 shows the flue opening in the center of the roof and roof forms still in place.

The interior of the combustion chamber before installing cast refractory is shown in Fig. 4. Litecast 50 in the flue is ready for connection with the Litecast of the combustion chamber. There are two combustion chambers for each furnace; each has one burner.

Fan housing cast from nonmetallic

No metal reinforcements were required throughout the furnace, thereby eliminating problems that might arise as a result of the difference in the coefficient of expansion of steel or iron and cast refractory materials.

In addition to the original furnace design and the use of 100 pct cast refractory material, several other features of the furnaces are unique. For example, the double-insulated fan housing is nonmetallic cast material. The fan is a special design, built especially for these furnaces. North American 58-series burners were used.

Design of the furnace departs in several important respects from standard furnace construction. Only the heated return air goes through 6-



FIG. 1—Furnace during construction. Litecast 50 walls and bottom are completed.



FIG. 2—First main roof forms are in place. Cast sidewalls extend below rails.



FIG. 3—View of the flue opening in center of roof. Roof forms still in place.

ALL-CAST FURNACE DATA

Dimensions

Length—28 ft, 5 in.
Width—5 ft
Height—7 ft

Height—11 ft, 3 in.

Outside
Inside
Main furnace section
Overall, including combustion
chambers

Working Chamber—4½ in. wide x 20 in. high
x 20 ft, 11 in. long

Main Arch—5 in. rise on 4½ in. span
x 20 ft, 11 in. long

Material Used

(Two furnaces)

Litecast 50—18 tons for main furnace
Litecast —12 tons for combustion chambers
A-23 IFB —80 Arch brick for door arches
Acme tile —16 pcs over burner as blow off covers

bladed fans which are operated at a speed of 960 rpm by 10-hp motors.

Fresh air is picked up at the center of the chamber. Heated air is pulled back from each end toward the center of the furnace. Air is pulled into the intake side and discharged through an outlet into the work chamber. Air return is through the flue.

In these furnaces, the aspirator is a part of the discharge setup, mixing fresh and heated air in the stream en route to the work chamber.

Operating experience during the past eight months shows that an unusually small amount of makeup air is required—on the order of 10 to 15 pct. The furnaces have outstanding ability to maintain good operating balance; there have been remarkably few blowouts or other operating difficulties.

The economics favoring cast furnace construction are simple. While the initial cost of insulating brick and Litecast refractory are approximately the same, there is a big balance with respect to labor cost in favor of cast material. The 23-ft all-cast furnace required less than 480 man-hr to complete, including the preparation of forms, settling of forms, pouring of material and removal of forms.

Costly brickwork eliminated

The job of cutting and fitting brick for the combustion chamber, for example, was eliminated. This job alone often requires several hundred man-hr where the furnace is built of brick. Another advantage in using cast material is that the combustion chamber is not limited to a shape that may not provide the most efficient operation.

At the present time, the two all-cast furnaces at Lansing Drop Forge Co. are being used to heat treat 81 mm shells. Both furnaces operate on 1000 btu city gas. The annealing furnace operates continuously at 1250°F. The furnace used for stress relief of forged shells operates at 1000°F. Both furnaces are supplied by a continuous alloy steel belt, see Fig. 5. The belt is driven by a 3-hp motor. Time in the 23-ft annealing furnace is approximately 50 min. The stress relief operation requires 1 hr 10 min. Discharge end of a furnace is shown in Fig. 6.

Operations always balanced

Design of the all-cast furnaces permits continuously balanced operations at all times, despite variations in loading or fluctuations in operating conditions. Burner and furnace design eliminate back pressure. There has been no tendency of too much aspiration pulling the flame out too far.

Operating experience up to the present time shows that approximately 800 cu ft of 1000 btu gas is required, on an average, for each 4500 lb of steel processed in these all-cast furnaces.

Controls used are Leeds & Northrup standard equipment. Thermocouples are located immediately above work in the center of the air stream from the combustion chamber.

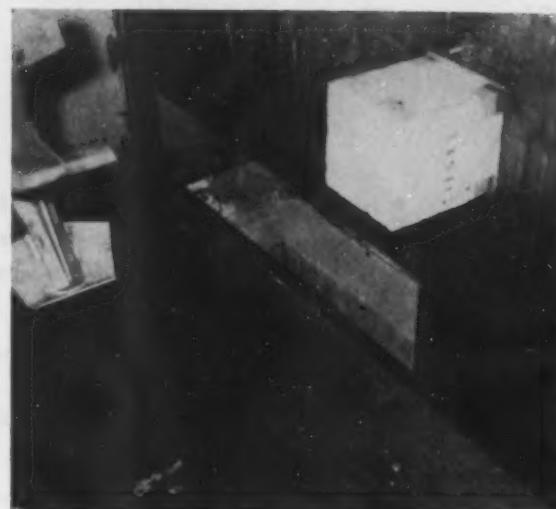


FIG. 4—Interior of combustion chamber before installation of cast refractory.

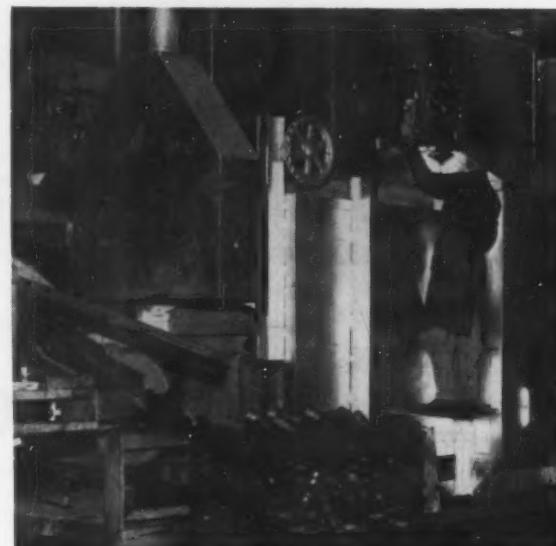


FIG. 5—Side view of all-cast furnace. The furnace is fed by belt from the left.

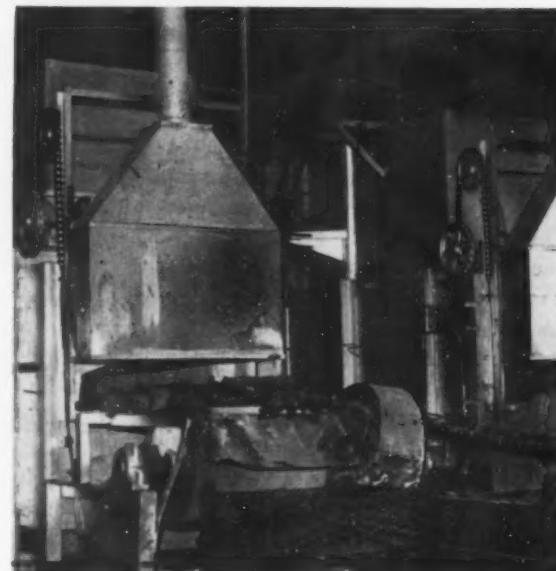


FIG. 6—Discharge end of the furnaces. Both furnaces have all-cast construction.

Changes with age—

♦ Instability of some titanium aircraft alloys at temperatures where they are most useful, 600° to 900°F, poses a problem for designers . . . The alloys are least stable in the range where they offer most operating advantages.

♦ To nail this problem down, Westinghouse studied the effects of aging on an iron-chromium-titanium alloy . . . Aging temperatures of 500°, 550° and 600°F were selected. Samples held from 75 to 275 hours show typical age hardening reactions.

♦ Aged samples show a distinct refinement of grain structure . . . Tensile strength is up . . . Usually there's a small decrease in ductility.



By H. A. Jahnle

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How Stable is Titanium in Vital

♦ SOME COMMERCIAL TITANIUM alloys are unstable between 600° and 900° F, the range in which they offer most advantages to design engineers. This instability shows up as a change of properties which may or may not be advantageous to the future operation of the part. Designers need to know how—and how much—properties change so treatments can be devised to eliminate adverse conditions during operation.

Most alloys developed for aircraft use have up to 8 pct metallic alloying additions plus small amounts of nitrogen, oxygen, and carbon. These are generally typed as alpha-beta alloys because of the two phases present at room temperature. Alpha, the hexagonal close-packed structure, is stable in pure titanium at room temperature. The alpha phase transforms at about 1625° F to the beta phase. This has a body-centered cubic structure and is stable to the melting point. Sometimes a third phase, gamma, is present at room temperature. It consists of one or more intermetallic compounds depending on the number and kind of alloying additions.

Studies of titanium base alloys^{1,2,3} show the alpha-beta type are unstable at room temper-

atures unless cooled very slowly from the beta phase region. This is particularly true for the iron-chromium type alloys with metallic additions below 5 pct such as the alloy 1.3 pct Fe, 2.3 pct Cr. While phase diagrams for the iron-chromium-titanium alloys system are yet incomplete, it is possible to devise diagrams with sufficient accuracy for this discussion.

Composition and forging range of an iron-chromium alloy is shown on a phase diagram, Fig. 1. Total alloy content is shown, rather than either total iron or total chromium. The effects of iron and chromium on the phase transformations of titanium are very similar at the titanium rich region. The dashed line represents alloy composition and the phases present under equilibrium conditions.

Upon cooling from the forging temperature under equilibrium conditions, several reactions take place. As the temperature is lowered to the eutectoid temperature, part of the beta phase, present at the end of the forging operation, transforms to alpha. In cooling through the eutectoid temperature, beta transforms to gamma which represents intermetallic compounds. As the alloy is cooled further to room

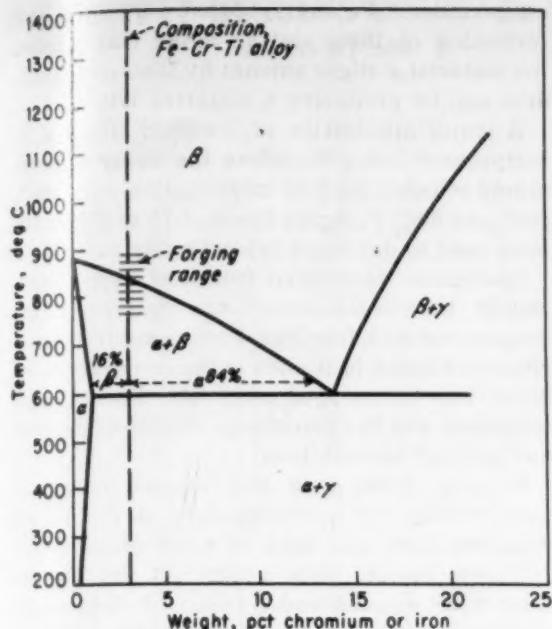


FIG. 1—Phase structure of a tentative titanium-chromium or iron alloy. Broken line, left, represents phase structure of the alloy under equilibrium conditions. Color lines indicate extent of the forging range.

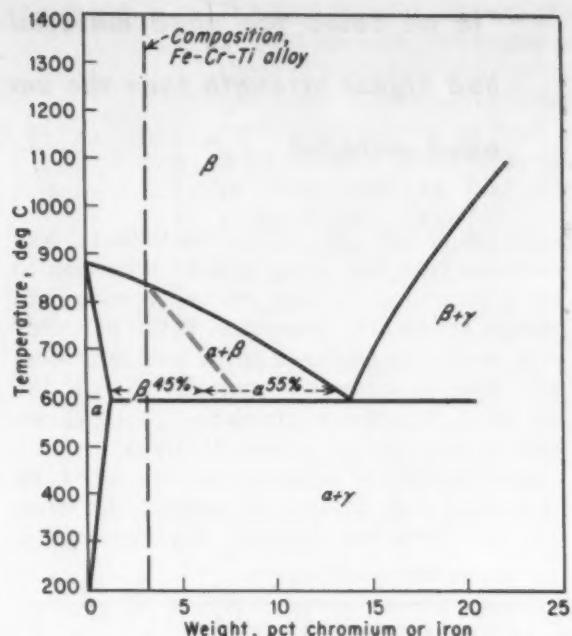


FIG. 2—Transformations are not complete in normal forging and cooling processes. New line, shown in color, illustrates per cent of alpha and beta phases present under normal cooling conditions in alloy shown in Fig. 1.

Operating Range?

temperature, the amount of gamma increases slightly. Reactions are very sluggish and a very long time is necessary to realize complete equilibrium at room temperature.

In the normal forging and cooling processes equilibrium is not attained, and the above transformations are not complete. Thus, in Fig. 2, another line is added to the phase diagram of Fig. 1. This line denotes the amount of phases present under normal cooling conditions. When cooling in air from the forging temperature the beta phase begins to transform to alpha phase by a shear-type reaction similar to the martensitic transformation in carbon steels. Sluggishness of the reaction and rapid cooling restrict the amount of alpha phase produced. By graphical calculations on both diagrams it is found that transformation is only 65 pct complete at the eutectoid temperature. It must be remembered that *this is only a hypothetical case* used for this discussion. Part of this beta continues to transform to alpha and gamma below the eutectoid temperature, but the amount of these phases produced is small.

Thus at room temperature we have an unstable material which may proceed toward

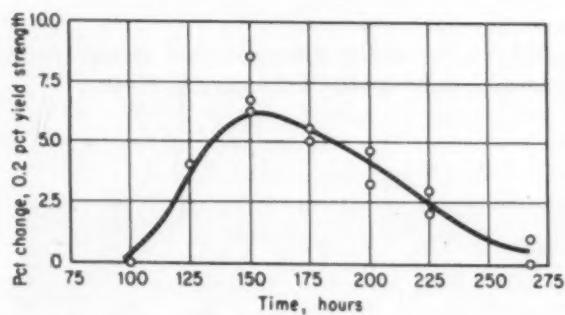


FIG. 3—Per cent of change in yield strength for samples aged at 500°F for varying times.

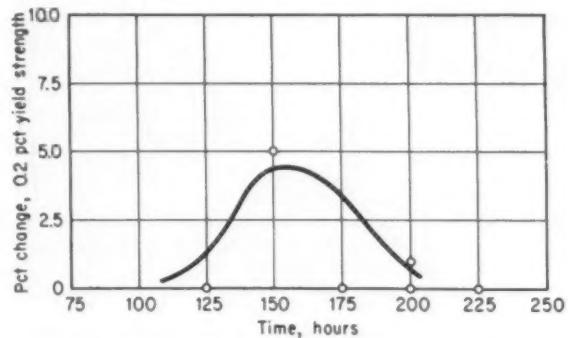


FIG. 4—Per cent of change in yield strength for samples aged at 550°F for varying times.

"In all cases the aged material had higher strength than the unaged material . . ."

equilibrium with the application of heat. Any reactions that take place will be accompanied by a structural change, which in turn will change mechanical properties. Relief of coherency hardening produced in the cooling process will tend to soften the material as will the relief of stresses introduced by the shear-type transformation of beta to alpha.

Grain growth of alpha at the expense of the beta phase may produce an interlocking structure and strengthen the alloy. The intermetallic

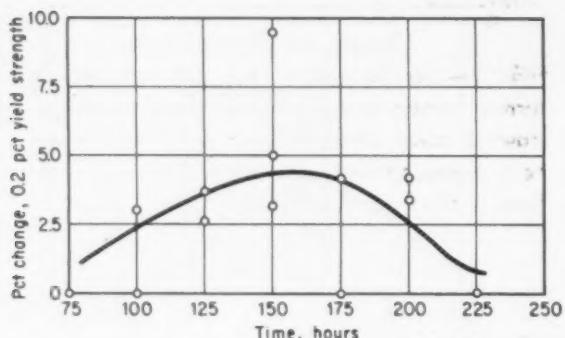


FIG. 5—Per cent of change in yield strength for samples aged at 600°F for varying times.

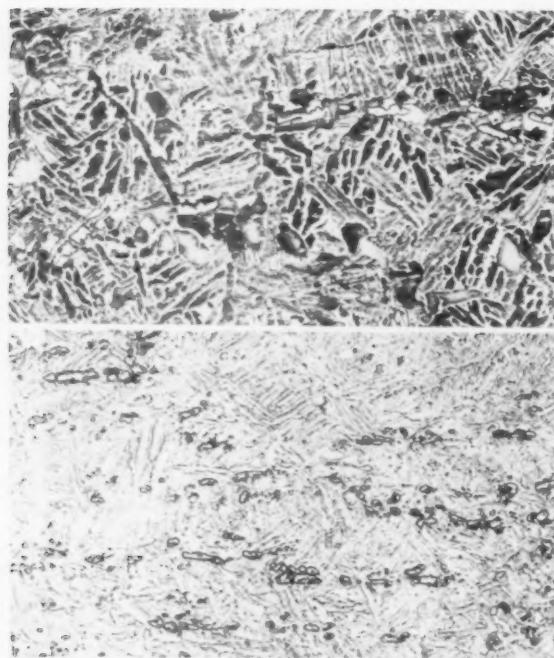


FIG. 6—Distinct difference was found between micro-structure of unaged SJRK-4 sample, top, and sample aged 125 hr at 500°F, bottom. 250X

compounds Ti_2Fe and $TiCr_2$ are very hard, and formation of these during aging may harden the material a slight amount by their own hardness and by producing a distorted lattice.

A major application of titanium alloys is in compressor disks, therefore the aging temperatures selected for this investigation were 500°, 550° and 600° F. Aging times of 75 to 275 hours were used to develop a typical aging curve.

Specimens were taken from test rings which supply the usual acceptance specimens for compressor disk forgings. Specimens from each ring were tested in tension in the as-received condition and in the aged condition. Results were compared, and the percentage change calculated and plotted against time.

Samples from aged and unaged materials were studied for microstructure. A red tinted polarized light was used to make phase determination easier. Beta grains do not change color when rotated under polarized light while alpha grains do. Samples were also prepared for x-ray diffraction studies to determine the presence of intermetallic compounds.

Tensile properties of aged and unaged samples are listed in Tables I, II and III. In all cases the aged material had higher strength than the unaged material with small decreases in ductility in most tests. The 0.2 pct yield strength was increased as much as 9.5 pct when aged at 600°F for 150 hours, while the ultimate strength increased 9.1 pct under the same conditions. The greatest change in ultimate strength, 12.6 pct, was found after aging at 550°F for 150 hours.

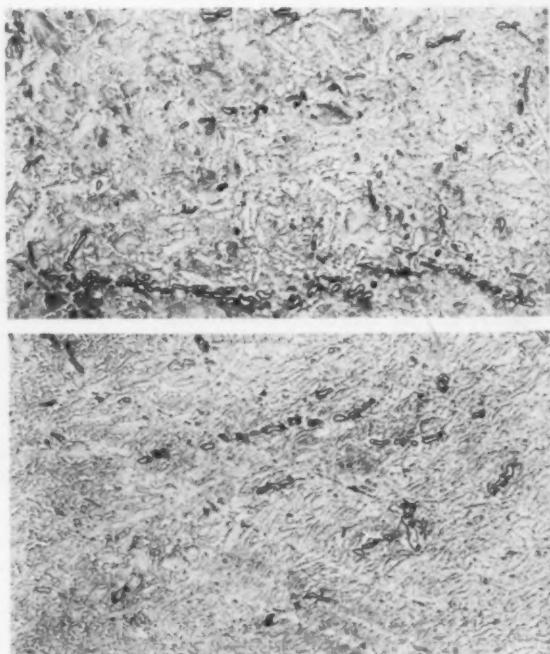


FIG. 7—Aged SJRD-1 samples show refinement of grain structure. Sample, top, unaged. Sample bottom, was aged 24 hr at 550°F. 240X

TENSILE TEST RESULTS ON Cr-Fe-Ti ALLOYS AGED AT 500° F

TABLE I

Specimen	Unaged			Aged			Percent Change		
	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct	Ultimate Strength	Average Elongation
100 Hr SJRD-1	120	128	3.0	122	138	1.1	...	8	...
	123.1	128.4	3.6	124	138	5.0	...	8	...
125 Hr SIFL-2	110.5	128	7.2	115.5	140	7.0	4	7	-30
	111	131	12.6	...	...	...	...	...	...
150 Hr SIBJ-2	110.4	133.3	8.8	119	138	12.2	6.25	4.8	...
	113.6	132	14.0	120	140	6.2	8.6	8.6	-45
SHRM-14	110.4	129	10.4	120	140	6.2	8.6	8.6	...
	110.5	129	11.1	124.5	142	5.4	8.6	6.4	...
SGIR-3	113	131	5.6	124.5	142	5.4	8.6	6.4	...
	116.8	136	10.8	122	142	6.2	6.7	10.5	-10
SHRK-8	113.2	120.5	6.0	122	142	6.2	6.7	10.5	-10
	112.2	121.3	8.0	...	...	...	...	...	...
175 Hr SJUK-7	100.1	120.5	14	105	130	16.8	5.0	7.6	+25
	98.8	120	13	132	144	1.22	5.6	10.1	-10
SIDD-12	125.3	131.3	1.3	132	144	1.22	5.6	10.1	-10
	125	130	1.45	...	...	...	...	...	...
200 Hr SIDD-17	108.1	125.2	6	112.5	134	14.2	3.2	7.2	+135
	109.3	125.6	6	114	136	5.2	4.6	6.8	-30
SIDD-16	109	128	9.4	114	136	5.2	4.6	6.8	-30
	110	128.5	6.2	...	...	...	...	...	...
225 Hr SIDD-18	114	131.7	6	117	138	15.2	2.7	4.5	+200
	114.2	132.1	8	106	128	10.0	2.0	8.8	+12
SIDD-19	103	118	8.5	106	128	10.0	2.0	8.8	+12
	104	118	9.3	...	...	...	...	...	...
240 Hr SJJC-4	116	123.5	1.4	114.5	136	3.9	...	9.7	+100
	114	124	2.6	110	132	2.1	1	5.6	-54
SJRI-1	108	123	3.2	100	127	9.0	...	4	...
	102.5	125	6.0	...	...	...	...	...	...

TABLE II

Specimen	Unaged			Aged			Percent Change		
	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct	Ultimate Strength	Average Elongation
125 Hr SJRK-2	129	136	0.5	117	136	2.4	...	...	+70
	127	141	1.8	132	133	1.6	...	...	...
150 Hr SJRK-1	114.5	129.5	5.4	124	142	1.6	5	12.6	-80
	118	137	8.5	124	142	1.6	5	12.6	...
175 Hr SJRK-6	129	139.5	5.2	127	137	2.6	...	...	-40
	130	138	3.6	...	...	...	...	...	...
200 Hr SJRK-4	110	123.5	5.0	109	129	5.0	...	4.8	+15
	108	123.5	3.8	...	...	...	...	...	...
SJJC-1	128	142	3.0	125	146	1.9	1	1.5	-50
	120	136	4.6	...	...	...	...	...	...
225 Hr SJRD-1	120	128	3.0	120	125	1.6	...	...	-50
	123	128	3.6	100	127	9.0	...	4	-35
SJUK-4	102	120	14	100	127	9.0	...	4	...
	102	122	13.8	...	...	...	...	...	...

TABLE III

Specimen	Unaged			Aged			Percent Change		
	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct Kips	Ultimate Strength Kips	Elongation, pct	Yield Strength, 0.2 pct	Ultimate Strength	Average Elongation
75 Hr SJRC-1	110	123	1.8	116	135	3.1	2.6	4.6	+30
	114	130	3.0	110	127.5	2.3	...	...	...
100 Hr SIBJ-1	109	128	6.2	110	127.5	2.3	...	...	-70
	110	129.5	8.6	...	...	...	...	...	...
125 Hr SIBJ-2	115.2	127	5.2	115	131	9.0	...	4.0	+20
	112.8	125	8.0	106	119.5	1.7	3	...	-86
150 Hr SIDD-15	102	119.5	4.6	106	119.5	1.7	3	...	-75
	103	121.6	5.6	...	...	...	...	...	...
175 Hr SJRC	108	130	16.8	113	136	13.2	3.7	4.7	-20
	108	130	16.2	117	141	4.6	2.6	9.4	-75
200 Hr SIDD-11	126	144	2	138	156	1.6	9.5	9.1	-35
	126	140	3.0	130	138	1.2	5	1.0	-90
225 Hr SIBB-2	126.3	137.5	3.4	132	149.5	3.2	3.2	5.8	+30
	128	142.3	7.0	...	...	...	...	...	...
250 Hr SIRD-1	123.1	128.4	3.6	123	140	3.1	...	9.0	-10
	120	128	3.0	...	...	...	...	...	...
SJRK-1	114.5	129.5	5.4	123	144	1.7	4.2	6.9	-75
	118	137	8.5	...	...	...	...	...	...
275 Hr SJIC-1	121.2	133.2	4.2	125	134	1.6	3.3	4.4	-55
	118	133.2	4.8	123.5	140	2.5	4.2	4.4	...
225 Hr SJIC-2	117.8	135.3	5.6	...	...	...	...	...	...
	123.2	134	16.0	125	144	6.0	...	6.9	-50
225 Hr SIDD-14	120.5	133.4	10.0	116	141	8.5	...	6.0	-42
	116	132	18.8	...	...	...	...	...	...

Figs. 3, 4 and 5 show the change in yield strength for varying aging times at 500°, 550° and 600° F, respectively. These curves indicate a typical age-hardening type reaction. Because of the wide scatter in the results of the ultimate strength and elongation, plots of these values give no indication of an instability range.

The photo micrographs, Figs. 6 and 7, show a structural change, primarily refinement. Under polarized light most of the smaller grains in the aged material were identified as alpha phase. In some samples the alpha grains appeared to be growing across the beta grains.

From tensile results it appears that aging raises room temperature tensile strength. Now, either there was no stress relieving, or resultant softening was small compared to total hardening effect.

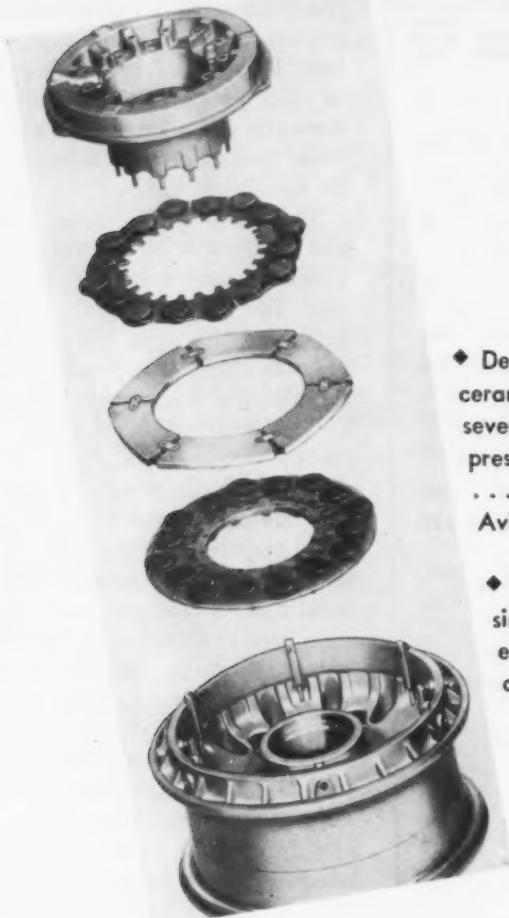
The forgings, metallurgically, have more than one phase. Grain size varies considerably. But aged samples always had a larger number of small alpha grains than the unaged material. Thus, in aging, alpha grains are precipitated—probably at the expense of the beta grains. The beta grains in turn become richer in iron and chromium.

The compound formation, which would probably be in very small amounts, may harden the alloy in two ways: the hardness of the compounds themselves; and lattice distortion.

The titanium alloy studied, 1.3 pct Fe, 2.3 pct Cr, becomes unstable at 500°, 550° and 600° F, when held at temperature for periods of 75 to 275 hours. This instability shows up as a precipitation of alpha grains and a change in room temperature tensile properties.

REFERENCES

- W. J. Fretague, C. S. Barker and E. A. Petetti, "The Titanium-Iron Phase Diagram," Air Force Technical Report 6597 Part I, Nov. 1951.
- F. B. Cuff, Jr., A. S. Jonkunen, L. S. Richardson, J. C. Nicholls, "Studies and Experimental Investigation for the Development of Phase Diagrams of the Titanium-Chromium and Titanium-Copper Alloy Systems," Air Force Technical Report 6595 Part I, Nov. 1951.
- M. Hansen and H. D. Kessler, "Titanium Alloy Development," Society of Automotive Engineers, Jan. 1953.



By W. G. Patton
Ass't. Technical Editor



- ◆ Developing and testing metals and ceramic materials that will stand up under severe loading at high temperatures presents many difficult problems.
- ... At South Bend, engineers of Bendix Aviation Corp. have found an unusual answer.
- ◆ Tests devised for heavy aircraft brakes simultaneously permit accurate evaluation of both metals and ceramic materials at elevated temperatures.

EXPLODED VIEW of a Bendix segmented rotor brake used on a big transport aircraft. The ceramic-type braking material is inserted and held in shallow metal cups.

BRAKE TESTS AID STUDY of High Temperature Physical Properties

◆ A GIANT DYNAMOMETER designed by Bendix aviation Corp. engineers working in cooperation with engineers from Adamson United, Akron, tests the effectiveness of brakes for huge military bombers and commercial airliners and simultaneously provides a unique laboratory for determining the resistance of metals and non-metallics to repeated cycles of heavy loading and wear at elevated temperatures.

Simulated stops of a fully loaded bomber at the Bendix South Bend laboratory turn the surface of thick metal brake discs nearly white hot in seconds. In service, the surface temperature of the metal will exceed 1800°F. At the center of the rotor, temperatures are in the 1400°F to 1500°F range. Lining plates, stators and rotors

are known to reach 1200°F, depending upon the total energy absorbed.

Because of the loads imposed at high temperatures and the limited opportunity to dissipate heat, the physical properties of the brake materials are of primary importance. Friction properties are of secondary importance since the coefficients of friction of most ferrous materials are approximately the same.

Some idea of the severity of the Bendix airplane brake tests may be gained from the following requirements for a 24 in. 5-rotor brake.

80 stops at 21,600,000 ft-lb energy per stop at 21.8 sec.

20 stops at 25,644,300 ft-lb energy per stop at 24.4 sec.

2 stops at 31,642,000 ft-lb energy per stop at 25.7 sec.

To meet these requirements, Bendix engineers have devised disc brakes with Cerametallic linings. The Cerametallic lining contains no resin or other organic substances. Whereas conventional brake linings may lose 80 pct of their effectiveness due to heat effects, Cerametallic linings are unaffected by heat up to 2000°F.

The braking material of the Bendix segmented rotor brake is in the form of separate discs, which are retained in shallow metal cups. No rivets or bonding of the metal is required. A button, extending through a hole in the brake stator, fits in a mating button on the opposite side of the disc. Replacement of linings is simple, using only a screwdriver.

In addition to longer life and ability to withstand high temperatures, segmented rotor disc brakes do not fade or grab. They also have greater heat conductivity and better ventilation than conventional brakes.

A segmented rotor design is used to permit expansion and contraction due to heating or cooling while retaining perfect flatness. True flatness under all braking conditions is necessary to secure maximum braking effort at all times.

Loading of the rotor is so severe under some braking conditions that experimental rotors have been known to shrink as much as $\frac{1}{4}$ in. after undergoing a series of brake tests.

Since the rotating members of the Bendix airplane brake are not thin plates but substantial discs of sizeable thickness, an effective heat reservoir is provided. This capacity for heat absorption increases the rate of heat energy absorption of the friction members without producing excessively high temperatures in the rotors.

Segmented rotors are keyed to the wheel at their outer periphery so that they turn with the

wheel but have a limited free axial movement to permit application and release.

The stators do not turn with the wheel but are keyed to the brake carrier. Similar to the rotors, they have limited free axial travel.

The flexible attachment of the metal segments permits higher working temperatures without warping or cracking and simultaneously provides a limited amount of cooling from air circulation between the segments. The self-aligning of the segment surfaces permits the rotor members to lie flat against the face of the lined member, or stator.

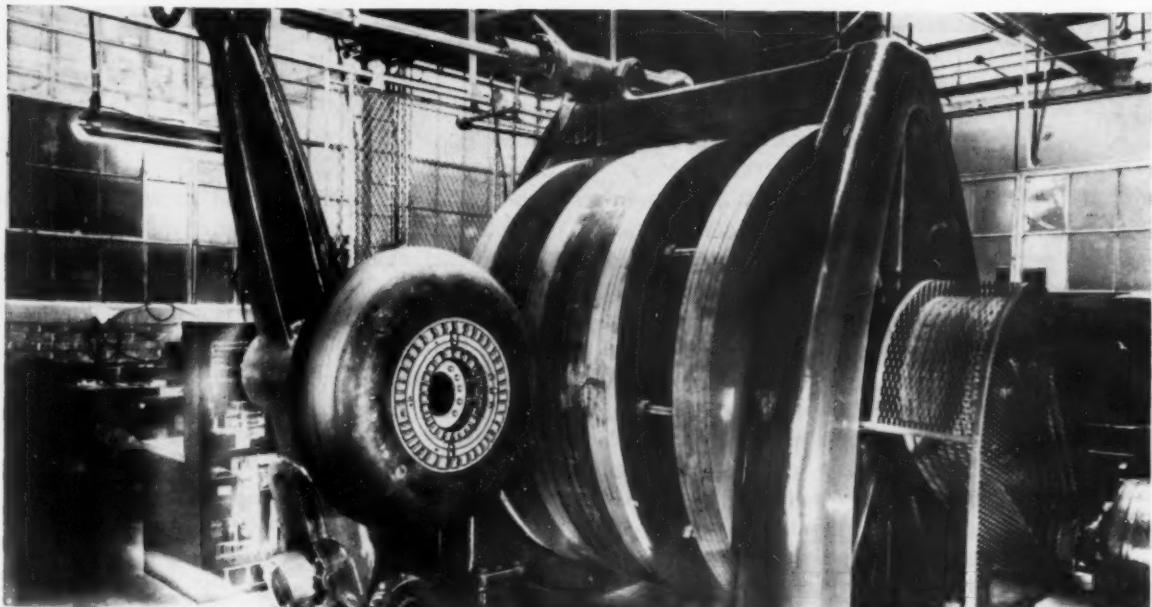
Brakes tested at South Bend range from 5 in. to 24 in. diam. The huge test machine was designed to be used safely with loads of 10 million ft-lb and upward. Any desired ground speed of a fully loaded plane traveling from 0 to 125 mph can be readily duplicated with this apparatus.

Scale indicates brake torque

During the tests, a segmented 7-ft fly-wheel is spun at a rate that simulates the kinetic energy of a loaded airplane. The dynamometer is powered by a dc motor drive rated at 125 hp. The flywheel is made up of 20 separate discs, each weighing 770 lb. The master disc is 12 in. wide. A scale capable of measuring a load of 1,782,000 in.-lb is used to indicate brake torque.

When the kinetic energy of the plane under test is duplicated, the tire and wheel assembly are brought into contact with the spinning flywheel. Simultaneously, the brake is applied at a predetermined rate.

Controls for the dynamometer are mounted on a separate panel and master control desk. Instruments used include chart recording chronograph pens, tachometer generator, electric counter, Chronoflex automatic reset timer and counters, electric clocks and hydraulic pressure gage.



SPARKS FLY when 7-ft flywheel is brought in contact with aircraft wheel assembly and brake

is applied. Flywheel has 20 discs, each weighing 770 lb, which are interlocked as desired.

INDUSTRIAL APPLICATIONS

Highlight Enamelers' Shop Practice Forum

- ◆ Growing architectural uses foreseen for porcelain enamel.
- ◆ Roller cooling frit saves space, time, labor.
- ◆ One-coat gray speckled titanium enamels form strong bonds.
- ◆ Adherence tester provides standard measurement.
- ◆ High-temperature coatings extend life of furnace tools.
- ◆ Waste liquor disposal process for small and large plants.

◆ TEST METHODS, standardization and industrial applications were topics of major interest at the annual shop practice forum of the Porcelain Enamel Institute at Columbus, Ohio. Five minute papers on new items again raced the clock and held the attention of the 300 members who attended.

Considerable discussion about architectural porcelain enamel indicates continuing advances in this field. Feeling is that wider use of porcelain-enamaled sheet for homes, store fronts and interior walls will be made in the future. Growing experience in achieving matte finishes, preventing distortion and better adherence is widening the field for this product. One major problem to overcome is the uniformity of color. Much attention was given to industrial appli-

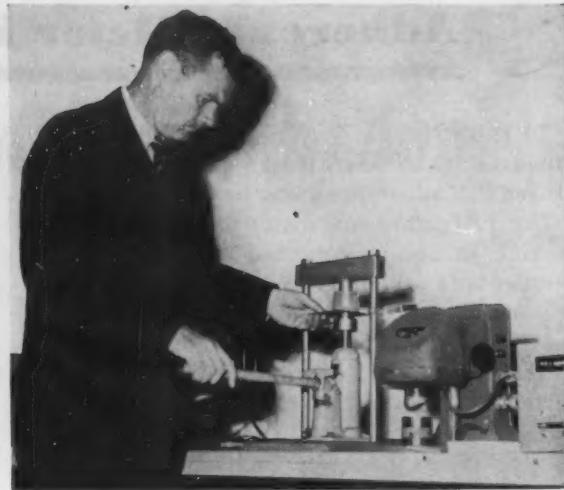
cations where corrosion and abrasion problems exist. Ball mill practice and pickle waste disposal discussions provided good take-home information.

Cooperation among PEI members over the past 15 years reached a new high at the shop practice forum. W. A. Barrows, PEI president, in his keynote address stated that a continuing cooperative attitude would show even better results in the future.

Among the top-notch papers delivered at the meeting were those covering "Roller Cooled Frit," "One-Coat Speckled Gray Enamel," "Tests for Adherance," "Extended Life of Furnace Tools with High-Temperature Coatings" and "Problems in Disposing of Pickling Waste."



PEI PRESIDENT W. A. Barrows stressed cooperation in his forum address to enamelers.



ADHERENCE METER use is demonstrated by E. C. Aydelott, Murray Corp. of America.

Roller Cooling For Quality Frit

Considerable savings resulting from elimination of drying equipment, space, time and labor are achieved by roller cooling frit. The process provides better quality frit with less loss of enamel and more efficient and cleaner grinding practice is according to R. C. Boyd, American Radiator & Standard Sanitary Corp. In this method, the enamel is melted in a continuous melting furnace. Instead of the conventional type spout a vertical discharge

orifice is used. The stream of molten enamel drops into the bight of a set of water-cooled rolls. These rolls are hollow and water flows continuously through them.

The enamel is compressed into a thin sheet and falls onto a vibrating conveyor where it is broken up in pieces small enough to be fed directly into a ball mill. Roller cooling was originally devised for dry process enamel but is now also being used in the wet process with many of the advantages of the dry process.

One Coat Gray Speckled Titanium

One-coat gray speckled titanium enamels were seen as having a revolutionary effect on the industry by H. L. Latimer, Moore Enameling & Mfg. Co. As a composition, these enamels are a blend of good titanium frit and a good blue ground frit, milled together with a suitable mill addition. The amount of titanium frit should not exceed 50 pct because loss of good bond would be the result with excess amount.

Although the blending of cover coat frits with ground coat frits may seem unorthodox, enlarged photomicrographic sections show that during the firing process a migration of cobalt to the steel-enamel interface takes place. This produces a strong union between steel and enamel.

Without changing the pickling procedure from that used for ground coat, millions of kitchen utensils have been successfully enameled without encountering any of the enameling problems sometimes resulting from improper

steel pickling procedure prior to coating.

The gray speckled titanium enamels will fire to maturity with ground coat and finish coat enamels. Firing conditions must be uniform to obtain the same color or shading of the fired finish. Gray speckled titanium enamels are subject to the same sensitivities as titanium cover coat enamels.

Physical properties of the fired enamel are far in excess of the commercial standard of the enameled kitchenware industry. Requirements include quality of base metal, appearance, thickness, enameling, resistance to boiling acid, thermal shock and impact, capacity, methods of test and identification.

By using one-coat gray speckled titanium enamels as a base, many beautiful colors have been developed by the controlled addition of color oxides. Because of the cobalt blue element, these colors are limited to blues, greens and browns of various shades.

Adherence Meter For Production Use

To raise the quality of porcelain enamelled products while increasing efficiency, an improved PEI adherence meter has been developed.

The PEI adherence meter and standard test provide an accurate method of measuring adherence and assigning to it a numerical value according to E. C. Aydelott, Murray Corp. of America. It is adaptable to metal gages from 13 through 26, and can be used on production parts as well as test specimens in the standard test procedure.

In using the meter, the enamelled metal surface is deformed by raising the surface which is supported on a deforming die against a stationary steel ball using a hydraulic jack. Die depths vary from 0.090 in. for metal thickness of 0.082 in. to a depth of 0.0176 in. for metal as thin as 0.016 in.

Five standard dies are supplied for metal gages from 14 to 26 gage plus a research die of still greater depth. Pressure is held at 2000

psi for 5 sec and the piece is then dropped on the table top to remove loose enamel fragments.

An area of exposed bright metal is provided for a ground wire connection by grinding off the enamel at one corner. The deformed area is then placed directly under the 169 needles or probes of the adherence meter, the ground wire is attached and the instrument is ready to operate.

Each of the probes is connected to an electrical circuit which is completed in turn through the grounded base metal of the test piece. Each probe touching bare metal completes a circuit and actuates a counter.

The poorer the bond, the greater is the area of bare metal exposed and the higher the number of counts on the counter. The better the bond or adherence, the less bare metal is exposed and the lower the number on the counter.

Waste Pickle Liquor Disposal

The A. O. Smith-Eimco process of sulfuric acid pickle waste disposal was described by Lorenz W. Heise of A. O. Smith Corp. At the present time, the A. O. Smith Corp. is neutralizing from 15,000 to 35,000 gal of waste pickle liquor that has an acidity content of 2.0 pct, specific gravity of 1.40 and a ferrous sulfate content of 50 pct by weight.

In this process, the waste liquor is held in a settling tank then taken to a mixing vat. Lime

or a high lime product is dumped into the waste at this point and mixed by hydraulic methods. The slurry formed at the mixer is taken to a filter where the liquid is removed and carried away. The remaining semisolid material is taken to a roasting oven and then stored for ultimate removal to appropriate disposal facilities. This method it is claimed can be adapted to either small or large plants.

High Temperature Coatings Grow

A paper by T. F. Moeller, Ferro Corp., reported extended life of furnace tools by use of high-temperature coatings. These coatings have opened up a new approach to the problem of oxidation failure of furnace tools and working parts. Firing temperatures of these coatings are 1750 to 2150°F.

At present there are about 20 plants which are running trials on high-temperature coated enameling fixtures including cast suspension bars, coat hangers, fabricated rolled alloy and other special fixtures. Trials are also being run on furnace parts such as alloy drop rods and shoe plate track.

One eastern enameler reports that on a high-temperature (1750 to 1950°F) enameling job, uncoated cast alloy tooling was being replaced

100 pct every 30 days. A new set of tooling was coated with high-temperature enamel. The coating was every two weeks, as the original coating burned thin. The set lasted about three months. This enameler estimated that high-temperature coatings have more than doubled tool life as well as reducing scale.

In a hollow-ware plant, it was found that high-temperature coatings were effective in preventing oxidation after a period of 16 months. The tool also showed much less distortion than the uncoated companion pieces put in service at the same time.

Coating tools which have been in service are somewhat more costly since sand blasting must be very thorough. Plant trials indicate results should parallel those from new tool coatings.

Better Handling Methods

Simplify Hot Metal Distribution

♦ HOT METAL HANDLING problems were increased when McCulloch Motors Corp., Los Angeles, designed its diecasting department for maximum comfort of personnel. Improved handling methods made an unusual diecasting machine arrangement practical.

In building their new diecasting department, McCulloch wanted to take full advantage of the Los Angeles' climate. One wall of the narrow room was left entirely open. The fourteen diecasting machines are in one line, and each machine is by the open wall where a cool breeze is obtained without use of fans.

This arrangement is ideal for the operators but awkward for distribution of molten metal to holding furnaces. Grouping the holding furnaces around the break-down furnaces would have been more practical.

By skillful handling methods six men are able to melt and distribute to the spread out holding furnaces over 140,000 lb of magnesium and 140,000 lb of aluminum a month.

Metal is broken down at a central point, and distributed via three transport pots carried by fork trucks. The pots are electrically preheated to 1250°F before being used. Since the molten metal is in a transport pot a very short time, heat losses are slight and it is not necessary to heat the pots while they are in use.

Both break-down furnaces and transport pots

tilt. They were built by Pacific Scientific Co. The pots have a capacity of 300 lb, and are rated at 20 kw. Melting rate is 400 lb an hour. Aluminum is broken down in a Fisher furnace, and held in Ajax induction furnaces.



MAGNESIUM is broken down in special 80kw resistor furnaces, then poured into transport pots. Pots are designed for movement on fork trucks.



FORK TRUCK delivers transport pot of molten magnesium to holding furnace. Metal is held in

20kw resistor furnace. Diecasting machines are located at open side of the building.

HARD CHROME SOLUTIONS

Which Offers Better Plating Properties?



By R. A. Balbierz
and
H. D. Burgess



Engineering Process Unit
Boeing Airplane Co.
Wichita, Kan.

◆ Chrome plating solutions of the fluoride-catalyzed type offer many advantages over the standard sulfate baths . . . Deposits are better distributed, harder and have less effect on the fatigue life of the base metal . . . Fluoride baths also have better throwing power, faster deposition rate and higher cathode efficiency.

◆ Analytical control of the fluoride bath is simple, requiring only specific gravity checks and occasional analysis for impurities . . . Bath agitation must be frequent and adequate . . . This is important when making up new solution, adding makeup salts or after shutdown periods.

◆ HARD CHROME PLATING has been done for many years using a standard bath consisting of chromic and sulfuric acids, usually in a 100:1 ratio. More recently, a fluoride-catalyzed bath, containing an excess of catalyst, has been developed for producing hard chrome deposits. It offers some advantages over the sulfate-catalyzed bath¹ but it also has a few disadvantages. For purposes of comparison, both baths have been evaluated as to their relative plating properties.

Plating conditions for the tests were selected from published sources^{2,3,4,5}, and from recommendations of manufacturers of plating solutions. A stock of four proprietary solutions, termed A, B, C and D, was made up. Distilled water was used for makeup to avoid change in the total acid ratio or catalytic action in the bath due to chloride content in the tap water.

The two sulfate-catalyzed baths were made up of technical grade chromic and sulfuric acids, the chromate to sulfate ratio being adjusted to 100:1. For the fluoride-catalyzed

baths, proprietary salts were obtained from a commercial source. Bath concentrations are given in Table I.

Plating was done in 1000-ml beakers lined with polyethylene bags to prevent etching the

TABLE I

BATH CONCENTRATIONS

Solution	Class	Concentration
A	Fluoride Type I	258 g per liter of proprietary salts
B	Standard Sulfate Type I	250 g per liter CrO ₃ , 0.25 g per liter SO ₄
C	Fluoride Type II	250 g per liter of proprietary salts
D	Standard Sulfate Type II	400 g per liter CrO ₃ , 0.40 g per liter SO ₄

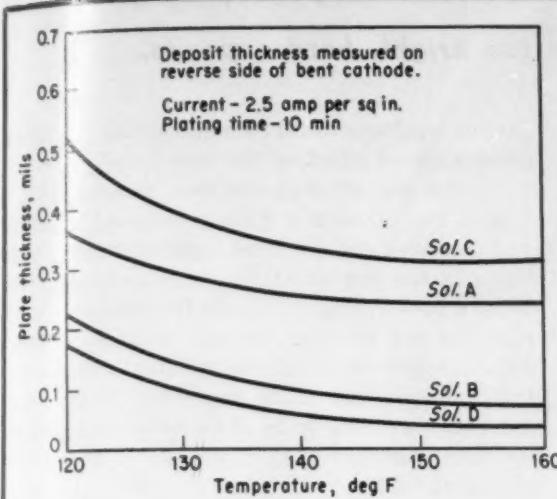


FIG. 1—Throwing power of fluoride-catalyzed solutions A and C is much greater than for the sulfate baths B and D. Two measurements were taken from back of each side of bent panel.

glass by the fluoride solutions. A hot-water bath heated the solutions and an immersion unit made of tubing provided a circulating cooling system. Temperatures were maintained within $\pm 2^\circ\text{F}$. To insure good electrical contact, the cast anodes, containing 93 pct lead and 7 pct tin, were bolted to the copper anode bars. Power was supplied from a rectifier having maximum ripple of 1 pct.

Standard Hull Cell steel test panels measuring $3.875 \times 2.625 \times 0.031$ in. were selected for the tests to determine throwing power. An area the width of the panel to 1 in. from the bottom was masked with pressure sensitive electroplating tape. The cathode was then formed lengthwise to a 90° angle and affixed to a throwing power fixture.

A 1-v potential was applied to the plating cell prior to placing the panel in the fixture. Current was adjusted to the desired amperage after the test panel was in the cell. Panels were plated for 10 min with a different bath

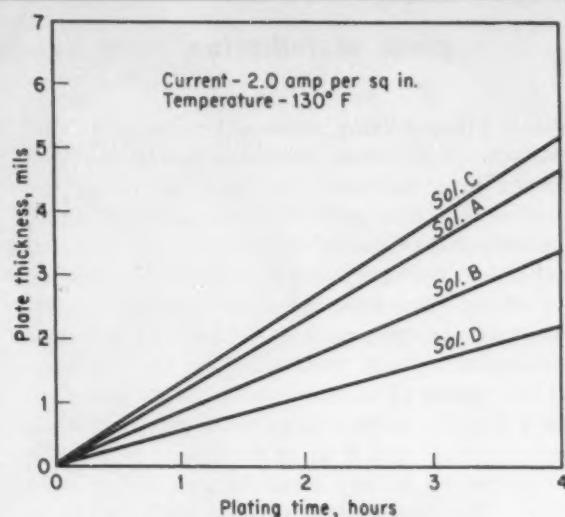


FIG. 2—Plated thickness plotted against time shows that the fluoride solutions A and C have a much higher plating speed than the sulfate baths B and D. Plating was performed at 130°F .

temperature and current density for each set of panels.

Relative throwing power was determined by measuring the thickness of the deposit on the back side of the bent cathode at points 0.25 in. from the edge and 0.25 in. from the bottom of the panel. This was done with a magnetic instrument calibrated with Bureau of Standard samples. One measurement was made on each of the two backside surfaces in the same location. Figures in Table II represent an average of these two measurements.

The effect of temperature on throwing power of the various baths is shown in Fig 1. Fig 2 represents plating speed of the various solutions at 130°F and is the basis for subsequent dimensional plating.

It is evident from data in Table II and Figs. 1 and 2 that the fluoride-catalyzed solutions A and C show much better throwing power than conventional solutions B and D. To substantiate these data, deeply recessed parts were

TABLE II

THROWING POWER

Solution	Amp per sq in	Deposit thickness, in		
		120°F	130°F	150°F
A	2.0	0.00022	0.00016	0.00012
	2.5	0.00036	0.00028	0.00020
	3.0	0.00052	0.00040	0.00030
B	2.0	0.00014	0.00005	0.00004
	2.5	0.00020	0.00010	0.00005
	3.0	0.00036	0.00024	0.00012
C	2.0	0.00033	0.00024	0.0002
	2.5	0.00050	0.00037	0.00028
	3.0	0.00075	0.00057	0.00042
D	2.0	0.00012	0.00003	0.000015
	2.5	0.00015	0.000075	0.00003
	3.0	0.00032	0.00020	0.00007

TABLE III
CATHODE EFFICIENCY

Plating Time, hr	Solution	Temperature, °F	Copper Deposit, g		Cathode Efficiency, pct
			Deposit, g	Amp-hr	
1	A	130	0.2786	4.9100	4.14
			0.5546	9.3855	7.91
			0.8089	13.9708	11.78
2	B	130	0.2052	4.9100	4.14
			0.3875	9.3855	7.91
			0.5518	13.9708	11.78
3	C	130	0.3000	4.8859	4.12
			0.5820	9.4400	7.95
			0.8525	14.0959	11.88
1	D	130	0.1853	4.8859	4.12
			0.3160	9.4400	7.95
			0.4056	14.0959	11.88
1	A	72	0.3917	4.6876	3.95
			0.4336	4.9005	4.13
			0.4269	4.7834	4.01
			0.3672	4.7834	4.01
1	B	72	0.3917	4.6876	3.95
			0.4336	4.9005	4.13
			0.4269	4.7834	4.01
			0.3672	4.7834	4.01
1	C	72	0.3917	4.6876	3.95
			0.4336	4.9005	4.13
			0.4269	4.7834	4.01
			0.3672	4.7834	4.01
1	D	72	0.3917	4.6876	3.95
			0.4336	4.9005	4.13
			0.4269	4.7834	4.01
			0.3672	4.7834	4.01

Higher cathode efficiency of the fluoride bath speeds plating, improves plate distribution, both needed for bright, hard deposits.

plated without using internal anodes or special fixtures. In all cases, solutions A and C plated deeper into recesses. In some instances, the fluoride solutions gave complete coverage where conventional solutions would have required special anode configuration for similar results.

Cathode efficiencies were determined by plating steel bar specimens in series with a copper coulometer which provided for an accurate measurement of ampere-hours. Test bars, having a 2-sq in. surface area were plated in each bath for 1, 2 and 3 hr at a current density of 2 amp per sq in. and temperatures of 130° and 72°F. The coulometer, made from steel wire coiled about a 1-in. diam rod, was rotated at 1200 rpm during the plating cycle to prevent burning of the cathode. Test results are given in Table III.

In the temperature range of 120° to 150°F, cathode efficiency of the fluoride baths was about 33 pct higher than that of the sulfate-catalyzed baths. This higher cathode efficiency of the fluoride bath with resultant higher plating speed and better plate distribution is very desirable at elevated bath temperatures where bright and hard deposits are formed. Although cathode efficiencies of all baths operated at 72°F were markedly higher, deposits were dull and did not have optimum hardness.

Test bars for hardness determinations were the same samples plated for 1 hr at 72°F and those plated for 3 hr at 130°F in making the cathode efficiency study. Samples were sectioned and specimens about 0.5 in. from the bottom and 0.375 in. long were mounted in Bakelite. They were then polished and etched so that under proper magnification determina-

tion of hardness could be made on the chromium plate without effect of the base metal.

Hardnesses of deposits were measured on a Tukon Tester with a Knoop diamond indenter and a 500-g load. Five measurements were made in the center of the cross-section of the deposit and averaged. Table IV gives the hardness values for the various deposits. These data are indicative of the greater hardness of fluoride-catalyzed bath deposits. Even more significant is the wide difference in hardness between deposits plated at 130°F and those plated at 72°F.

Leveling action of the deposits was determined by measuring the amplitude of irregularities in microinches with a profilometer. Determinations were made before and after plating on test bars to a minimum thickness of 0.0020 in. Plating was done at 2 amp per sq in. and 130°F. Percent reduction in the frequency of irregularities is shown in Table V which indicates the leveling action of the deposits.

Porosity aids oil retention

The fluoride-catalyzed solution A offers somewhat better leveling action resulting from improved plate distribution and finer grain structure. The poor leveling action displayed by the solution C fluoride bath may be attributed to greater porosity of the basic deposit since it was not as smooth as that from the solution A bath. Deposits from the A bath undoubtedly have an advantage where lubrication is desired because plating speed and hardness is excellent and the greater porosity should give superior oil-retention properties.

TABLE IV

HARDNESS OF DEPOSITS

Solution	Solution Temperature, °F	Plate Appearance	Average Knoop Hardness
A	130	Bright	1178
B	130	Bright	965
C	130	Bright	1035
D	130	Bright	903
A	72	Dull	620
B	72	Dull	614
C	72	Dull	614
D	72	Dull	610

TABLE V

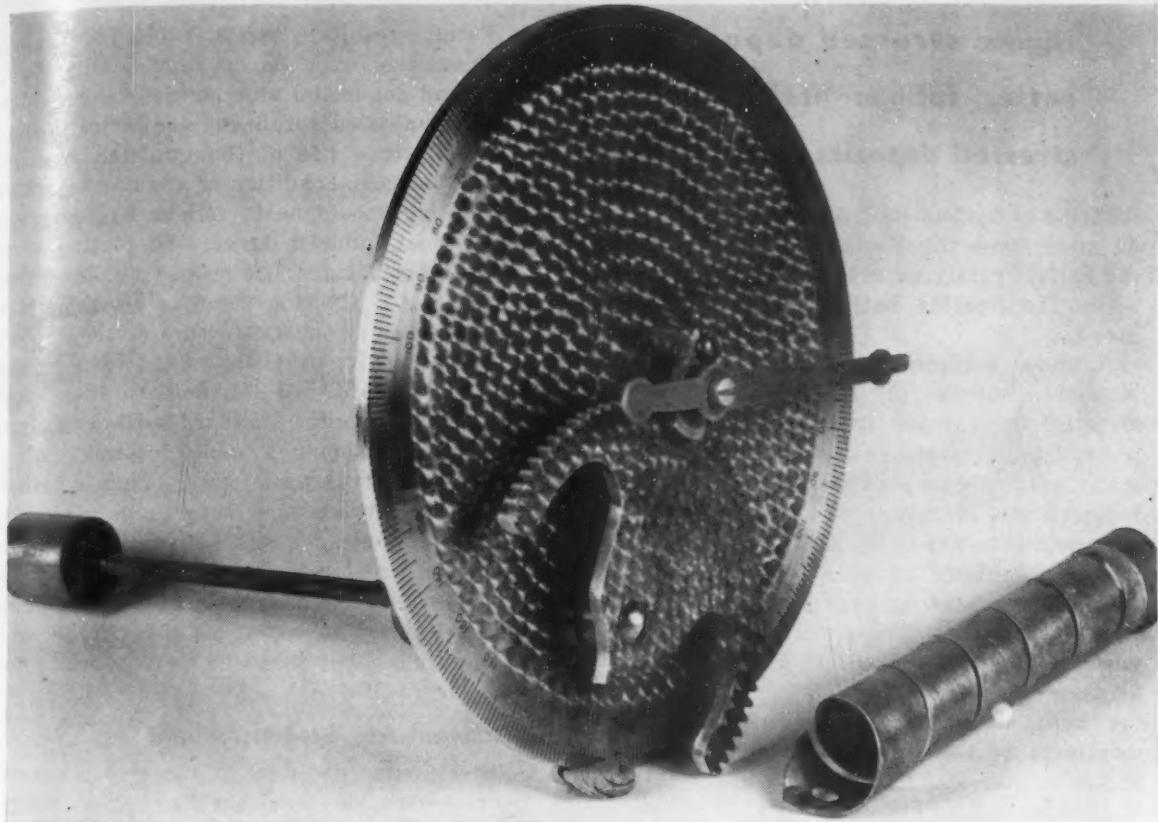
SURFACE IRREGULARITIES

Solution	Thickness of Deposit, in	Profilometer Reading, micromicrons		Reduction in Frequency of Irregularities, pct
		Before	After	
A	0.0023	50	16	88
B	0.0021	50	38	24
C	0.0020	50	45	10
D	0.0023	50	21	58

TABLE VI

STRESS MEASUREMENTS

Solution	Plate Thickness, in	Pointer Deflection Radians	Stress, psi
A	0.001	11.1	19,425
	0.0012	12.5	19,229
	0.0014	14.2	17,750
	0.0016	15.7	17,172
	0.0018	17.5	17,014
	0.002	19.2	16,800
B	0.001	8.5	16,600
	0.0012	10.7	15,808
	0.0014	11.7	14,625
	0.0016	13.3	14,547
	0.0018	15.0	14,582
	0.002	16.5	14,438
C	0.001	10.3	8,025
	0.0012	10.5	7,207
	0.0014	13.3	16,625
	0.0016	15.3	16,227
	0.0018	16.9	16,431
	0.002	18.5	16,188
D	0.001	8.6	15,050
	0.0012	9.5	13,855
	0.0014	10.4	13,000
	0.0016	11.7	12,798
	0.0018	12.8	12,444
	0.002	13.9	12,163



STRESS DETERMINATIONS of specimens were made by applying the angular deflection indicated by this spiral contactometer and helix according to a Bureau of Standard's formula

Adhesion of the different deposits was determined by the bend test described in Military Specification MIL-P-6871. Panels for this test were surface ground, electrolytically cleaned and flash pickled prior to plating. Plating was done at 2.0 amp per sq in. and 130°F for a sufficient time to deposit a minimum thickness of 0.002 in. as predetermined by previous measurements of plating speed.

Plated samples were bent through an angle

of 180° over a diameter the thickness of the base metal. Samples were then straightened and inspected under four magnifications for evidence of nonadherence of the deposit.

No evidence of poor adhesion was found on any deposit except one plated in the standard D solution. The reason for poor adhesion of this sample could not be determined.

All deposits were brittle and cracked immediately when bent for the adhesion test. For this reason, no difference in ductility of the different deposits could be determined accurately.

Analysis of the chromic acid and sulfate content of the sulfate solutions was made daily when these tests first started. Simultaneously, the fluoride baths were controlled by simple hydrometer readings which were converted to chromic acid concentrations from a precalculated table. Changes in bath concentrations were so minute that analysis was continued on a weekly basis after the first week. Evaporation losses were replaced by regular additions of distilled water.

At the end of this test work, about 25 analyses had been made on each bath. The time required for an analysis of chromic acid concentration by titration and for sulfate content by the gravimetric method took about 3 hr. Since the fluoride bath required no control or adjustment of the catalyst, analytical control of the chromic acid concentration, whether by

TABLE VII
FATIGUE TEST MEASUREMENTS

Solution	Test	Cycles	Average Bilateral Cycles
Unplated Steel	1	71,000	70,333
	2	68,000	
	3	72,000	
A	4	64,500	65,167
	5	65,000	
	6	66,000	
B	7	59,000	59,867
	8	59,000	
	9	61,000	
C	10	63,000	62,833
	11	62,500	
	12	63,000	
D	13	58,000	58,833
	14	60,000	
	15	58,000	

Higher stressed deposits give better fatigue life than lower stressed deposits . . .

titration or hydrometer, required no more than 30 min. Over the 25-week period, control of the sulfate catalyzed bath required 75 man-hr, while the fluoride bath required only 12½ man-hr.

A spiral contractometer, described by the National Bureau of Standards,⁶ was constructed to evaluate stress produced by deposits from the various plating solutions. This instrument can be used either as a laboratory research tool or in the shop as a quality control method to detect contamination of plating baths by periodic stress determinations.

The instrument is essentially a helix coil fixed permanently at one end of a rod and attached at the opposite end to a dial or pointer. Stresses causing contraction or expansion of the helix during plating were indicated by movement of the pointer. Angular deflection of the pointer was then applied to the Bureau of Standards formula as follows:

$$\text{Stress} = \frac{E t^2 P \times D}{6 \pi C h d}$$

Where: E = Young's modulus for copper
t = Thickness of strip
P = Width or pitch of strip
D = Angular deflection
C = Outside diameter of helix
h = Height of plated portion of helix
d = Thickness of plate deposit

Stress measurements of deposits from the various baths are shown in Table VI. Plating was done at 2 amp per sq in. and 130°F. In all cases, the stress differential induced on the outside of the helix by the chrome deposit contracted the helix.

Advantages favor fluoride

Stress values for deposits from both fluoride-catalyzed baths were higher than those for deposits from the sulfate baths. Therefore, it was thought that fatigue life would be of the same relationship. Subsequent data on fatigue life show that the converse is true in that deposits with higher stress have less effect on fatigue life than deposits with lower stress.

The effect of chrome plate on the fatigue life of AISI 4130 normalized steel was measured with a Krause fatigue testing machine. This machine is a fixed-deflection type which uses the specimen as its own dynamometer so that each specimen is calibrated in its testing position. Specimens were plated to a thickness of 0.002 in.

Fatigue results, given in Table VII, are only comparative based on constant plating thickness and set initial angular deflection. Values for the unplated specimens are indicative only of the fatigue life of the unplated specimen under the same condition of angular deflection. No baking was done to relieve hydrogen embrittlement induced during the plating cycle. The higher fatigue life values obtained from the A and C solution deposits are thought to be related to physical structure of the deposit.⁷

After studying all the data, it is evident that the fluoride-catalyzed chrome bath offers many advantages over the standard sulfate-catalyzed bath. Besides being a self-regulating bath, it has superior throwing power, higher cathode efficiency in the temperature range of 120° to 150°F, produces deposits with better plate distribution, greater hardness and less effect on fatigue life of the base metal. Cathode efficiencies of all solutions operated at 70°F were much higher but deposits were much softer and very dull.

Disadvantages are operational

The interesting effect of the highly stressed fluoride-bath deposits having better fatigue life may be due to a finer crack pattern in the plate and fewer metallic inclusions. This is hinted in the somewhat superior resistance of fluoride-bath deposits to salt spray exposure based on equivalent plate thickness.

Fluoride-catalyzed baths have some disadvantages depending on operational factors. Etching of low current density areas is said to be more prevalent than with the sulfate-catalyzed bath due to the higher activity of the fluoride ion when combined with hydrogen to form hydrofluoric acid. Since masking of such areas is standard practice in most shops, this should be of little trouble.

Although control of the fluoride bath is simple, requiring only frequent specific gravity checks and occasional analysis of impurities, it is very important that the bath be agitated sufficiently. This has particular significance when making up a new solution, adding makeup salts or after shutdown periods to insure proper distribution of the sparingly soluble catalyst.

REFERENCES

- ¹ Self-Regulating High-Speed Chromium Plating, Stareck, Paschal and Mahlstedt, AES Technical Sessions, Vol. 37, p. 31, 1950.
- ² Chromium Plating, G. Dubpennel, Modern Electroplating, The Electrochemical Soc., Spec. Vol., p. 117, 1942.
- ³ Principles of Electroplating and Electroforming, Blum and Hogaboam, 1949.
- ⁴ Electroplating and Metal Finishing Developments in Germany, Springer, AES Technical Sessions, Vol. 37, p. 91, 1950.
- ⁵ Some Factors That Influence The Operating Characteristics of Chromium Plating Baths, Hull and Winters, AES Technical Sessions, Vol. 36, p. 93, 1949.
- ⁶ A Spiral Contractometer for Measuring Stress in Electrodeposits, by A. Brenner and S. Senderoff, AES Technical Sessions, Vol. 35, p. 53, 1948.
- ⁷ Stress in Electrodeposits, Soderberg and Graham, AES Technical Sessions, Vol. 34, p. 74, 1947.

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Technical Briefs

BEARING DESIGN:

Service life, capacity increased in improved roller bearing.

Two to three and a half times longer life and 25 to 50 pct greater capacity ratings are claimed for an improved spherical roller bearing developed by SKF Industries, Inc., Philadelphia.

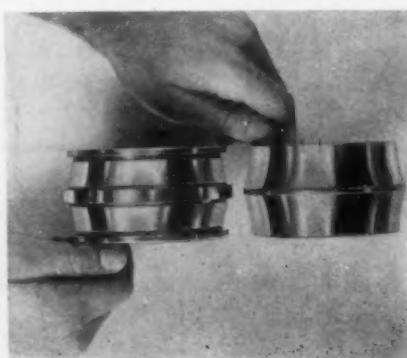
More bearing surface for the same size bearing increases production time on rugged equipment used by railroads, steelmills, papermaking plants, and on quarrying and road building equipment.

Use of smaller bearings for the same job allows equipment makers to build lighter machines. Complete interchangeability with old bearings permits use of improved bearings on existing equipment.

Helps Cut Downtime

SKF developed the "C" bearing, to meet the demands of heavy machinery and equipment users for a bearing with greater load capacity that would reduce downtime through longer life. The bearing has met these conditions, and shown outstanding performance improvement, without changing bearing size or weight, SKF engineers say.

Over a long development period, successful applications have been made in railroad journals, vibrating screens and steelmill machinery. These industries demand bearings that will carry capacity loads at high speeds, as their pro-



"C" TYPE spherical ring shows how ring has been redesigned without flanges and undercuts.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 87. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

duction costs are affected when time is lost for bearing changes.

Has More Bearing Surface

Principle feature of the improved bearing is an inner race design which allows longer roller contact. The new design eliminates undercuts and integral flanges. Its capacity is increased because longer rollers are used, with more effective contact between rollers and rings, in the



WINDOW TYPE CAGE used in the improved roller bearing is made of high tensile brass and gives trouble-free operation even in severe stress applications such as eccentric locations in shaker screens.



SEPARATE RING guides rollers mounted on inner race in the "C" type spherical roller bearing.

larger area provided by the new design.

A separate guide ring, between the two rows of rollers, allows them to take the position which their contact with the rings dictates. Load distribution is uniform at all times and greatly increased capacity and life result.

Carry Heavier Loads

Each row of rollers is held in a window-type cage made of high-tensile-strength, cold rolled brass. Mechanically, the cage is strong and well supported.

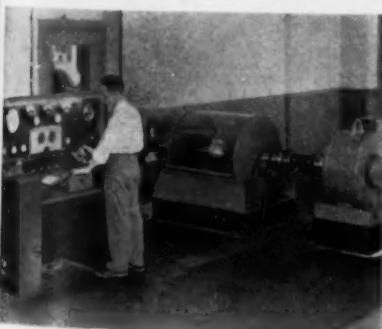
Each cage centers on two large areas, one directly on the inner ring—outside of the rollers—and the other on the outside diameter of the guide ring.

Where combined loads are present, the improved spherical bearing is capable of carrying heavier combinations of radial and thrust loads, or pure thrust loads of greater magnitude.

Can Be Interchanged

The important rolling self-aligning feature, invented and developed by SKF, has been preserved, so that considerable misalignment between the shaft and housing has no ill effect on bearing capacity or life.

While the new bearing delivers more capacity and longer life, it is interchangeable with older types size by size.



TORQUE AND THRUST of torque converters are tested at Baldwin-Lima-Hamilton Corp., Philadelphia, with two SR-4 Torquemeters and two SR-4 load cells. Strain gage is used as load sensing element. Load and torque indications are obtained by simple electrical circuit using strain indicator.

Turn to Page 136

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Iron Age

RCA NBF

REAMING FIXTURES:

Jig boring time cut 75 pct with improved reaming fixtures.

Bottlenecks in the production of airborne radar antenna units at Dalmo Victor Co., San Carlos, Calif., have been eliminated through wider use of precision built hand reaming fixtures.

These master fixtures, providing complete interchangeability of parts with near zero dimensional limits, have reduced the previous time-

consuming operation on jig boring machines by nearly 75 pct, at 10 pct of the cost.

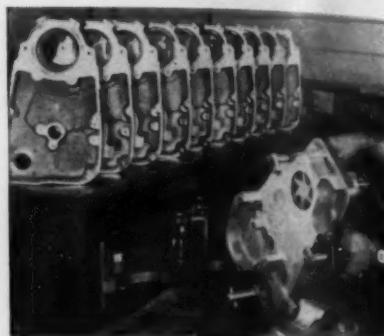
In many instances, components had to be preassembled and alignment insured by the use of specially ground plug gages and by hand drilling and reaming mating parts.

Designed and developed by the tooling section of the company's parts production plant, the fixtures are used for azimuth drive gear housings and other components requiring precision alignment of

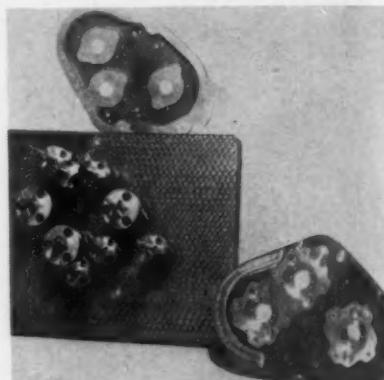
dowel pin holes, bores and outside diameters.

Use Meehanite Castings

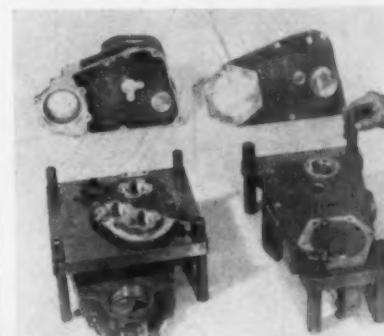
To meet the extremely close dimensions required to insure interchangeability in final assemblies, construction of the master reaming fixtures presented a problem in fix-



MASTER HAND reaming fixture is used on azimuth drive gear housing, a radar antenna component. On shelf are completed units with four reamed bores, the largest counter-bored and faced. Foreground, are plug gages used in checking bores and dowel pin holes. Under shelf is a specially designed alignment checking fixture.



TOP AND BOTTOM machining and hand reaming operations on gear housing covers produced at Dalmo Victor, San Carlos, Calif.



ALIGNMENT CHECKING fixtures for azimuth drive gear housing proves out correct location of bores and dowel pin holes and determines face squareness. Any casting distortion will show up here.

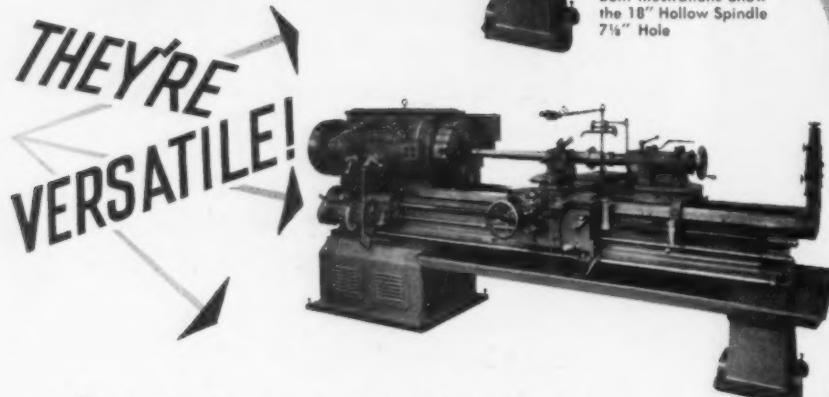
Turn Page

FOR FASTER PRODUCTION, BETTER WORK, LOWER COSTS— **HYDRATROL LATHES**

Large Hollow Spindle Type



Both illustrations Show
the 18" Hollow Spindle
7 1/8" Hole



- * Machine long work chucked through spindle.
- * Machine work between centers.
- * Also built with beds and carriages on each end of headstock for machining both ends of a shaft at one time.

SIZES 18" TO 36"
Small - 18" & 20" up to 7 1/8" Hole
Medium - 25" up to 12" Hole
Large - 32" & 36" up to 16 1/8" Hole
(Standard Type Lathes 16"-36")

IMPORTANT FEATURES

Timken Bearing Spindles.
Hydraulic clutches for forward and reverse, controlled from apron or headstock.
Hydraulic brake for close position control.
Hydraulic clutches self-compensating. No adjustment and full power capacity at all times.

LEHMANN
MACHINE COMPANY

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI
DIVISION OF NOVO ENGINE CO.

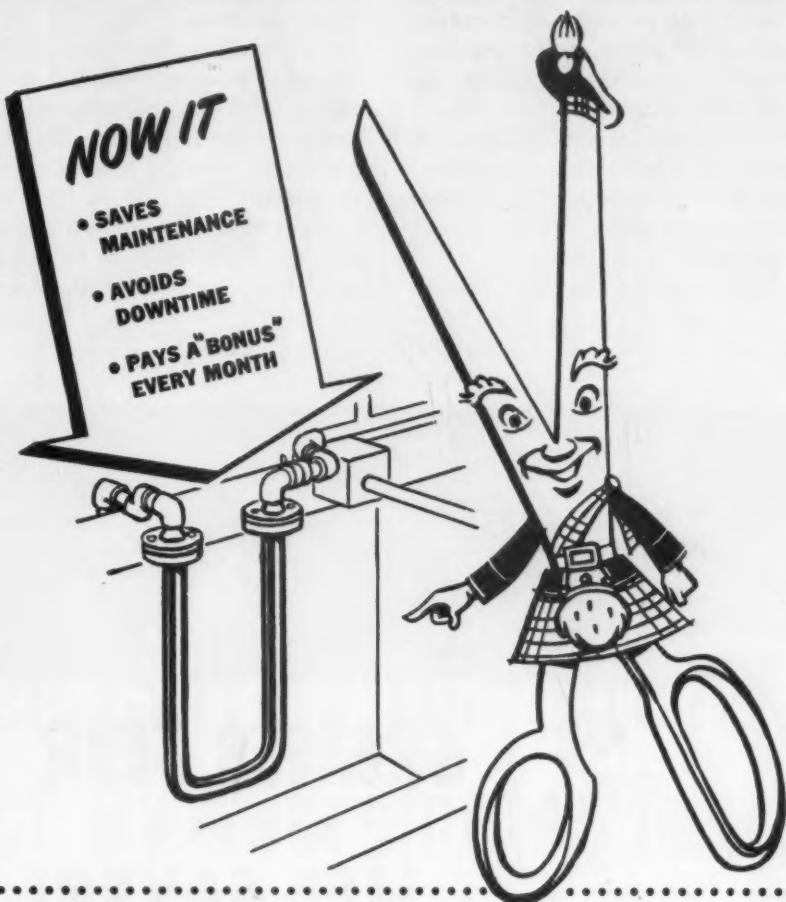


Heating coil saves twice its cost in a year

Lead coils were being used by a producer of automobile components to heat "dragout" chromium plating solution in a concentrating tank. Because of severe corrosion, the lead coils were either being repaired or replaced every month. This was costly not only in equipment and labor but even more so in downtime.

As "headquarters" for coatings for metals, United Chromium was asked what could be done. The Unichrome Man urged installing a Unichrome tantalum heating coil (which is more than just acid-resistant — it's acid-proof).

A half year told the story. No more breakdowns. The coil paid for itself in six months. At year's end, savings totalled to almost twice its cost — and the coil is good for years more of such trouble-free service.



MORE WAYS UNITED CHROMIUM HELPS CUT COST OF COATING METALS



No cyanide ...no disposal cost

Problem of waste cyanide disposal is serious one. Containing no cyanide, the versatile Unichrome Copper Plating Solution has enabled companies to save on both disposal equipment and cost of disposal.



Expense of new tanks avoided

A company, needing more capacity to plate increased cutlery production, found that using Unichrome SRHS Chromium Plating Bath speeded up plating output without need for extra equipment.



Maintenance money saved

A plant insulated and coated plating barrels with rubber. When a Unichrome Plastisol Compound was used instead, it not only cost less to apply, but also lasted 2 times longer.



UNICHROME

It pays to consult United Chromium on Metal Finishing Problems

United Chromium offers you the advantages of: (1) 25 years of specialized experience in metal finishing; (2) Wide experience in both organic and plated finishes; (3) A diversified line of products for decorative and functional finishing — including plating processes, protective coatings, chemical conversion coatings for zinc; (4) Thinking geared to cost-cutting, product-improving possibilities.

We'd welcome an opportunity to help you "Finish it better AND SAVE."

UNITED CHROMIUM, INCORPORATED 100 East 42nd St., New York 17, N.Y.

Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif. In Canada: United Chromium Limited, Toronto, Ont.

Technical Briefs

ture stability to assure constant reproduction of dimensions.

Meehanite castings are utilized as a supporting foundation for the balance of the fixture assembly. The castings are rough machined, stress relieved and ground true for face location of parts to be reamed. Bores for reamer journal guides and locators must be held within very close dimensional limits on a jig borer. Where production drawings allow ± 0.0005 in., jig boring tolerances on the fixtures are held to practically zero limits.

Journal guides and caps, reamer

bodies and shanks are fabricated of high carbon steel, rough machined, normalized and carburized. Guides and caps are ground, honed or lapped on all critical surfaces, maintaining extreme concentricity and face squareness.

Tungsten carbide inserts are brazed to reamer flutes and the entire unit ground on centers to near-zero concentricity and to the nominal diameter of the production part to be made.

All critical dimensions are checked with precision gage blocks and special gaging equipment. An ad-

ditional check is made by inspecting the fixture and the first part run on the jig borer.

Dalmo Victor is currently using several types of these master reaming fixtures, including those producing individual finished surfaces on external and internal diameters, face and shoulder dimensions, or a combination of these operations.

Besides providing precise alignment and interchangeability of parts, the fixtures eliminate match markings formerly used, hold scrap parts to a minimum and greatly reduce bench inspection time.

A GREAVES GEAR
CAN BE A
LIFE SAVER!

Ability to get good gears quickly in case of a breakdown—or for any other reason—can be a real 'life-saver'. Greaves offers that kind of service . . . the kind you can depend on when machinery is down and every minute counts. And Greaves is a good source for your day-to-day gear requirements, too. Why not write or wire us today for a prompt estimate. No obligation naturally.

Greaves makes spur, helical, bevel and worm gears, pinions, worms and leadscrews . . . in sizes from the small 'life-saver' variety up to—how big do you need 'em?

GREAVES

MACHINE TOOL
COMPANY

2400 Eastern Avenue, Cincinnati 2, Ohio

Established 1917

• Division J. A. Fay & Egan Co.



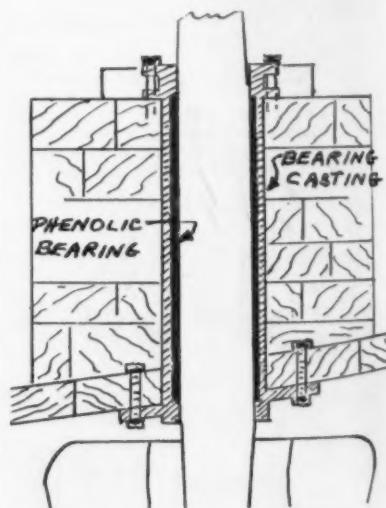
Makers of
Greaves Milling Machines

IMPREGNATION:

Technique important in getting most from metal fillers.

Macroporosity in manganese bronze castings used in Navy minesweepers presented the Navy with a special problem recently. Seepage through the castings would have permitted water contact with the wooden hull in areas where rot could develop. Use of fillers as a casting impregnant made the castings usable.

Forty-two rudder post bearing castings were made in manganese bronze for use on AMS Class Minesweepers. These castings are the main support for rudder posts. Bearing castings weigh 350 lb and



RUDDER POST bearing castings are mounted in wood hulls of Navy minesweepers. Seepage through castings would have endangered hull.

Turn Page

THE IRON AGE



AT SPENGLER-LOOMIS, ROCKFORD, ILL.:

Cities Service Cutting Oils Proved The Very Best By Micrometer Test!



CUTTER MEASURED WITH MICROMETER. As a final test, Automatic Pencil Sharpener measures each cutter with a micrometer. All tests proved that Cities Service cutting oil was absolutely tops for this really tough job.



STRICT SPECIFICATIONS REQUIRE FINEST CUTTING OIL. APSCO Sharpeners offer many more features than other brands. To produce their top quality product, Spengler-Loomis relies on top-quality lubrication products . . . Cities Service Products, famous throughout industry.

ONLY .005 INCHES BURR OR BUILD-UP ALLOWED IN FIFTY-HOUR OPERATION CUTTING GROOVE IN B1112 STEEL!

Says Mr. C. J. Kostrzewa, Plant Superintendent: "Cutting oil requirements in our Automatic Pencil Sharpener Division are tough. To find the right coolant, we called for, and tested, samples from various companies. Over a period of testing time, we used graphs, charts and tables, keeping a running record on all coolants. As a final test, we measured the cutter with a micrometer before and after milling. The cutting oil that came out tops was Cities Service."

"I'd also like to point out that the Cities Service Engineering staff co-operated fully by offering helpful advice and excellent service."

Why not discuss your lubrication problems with a Cities Service lubrication engineer? Write Cities Service Oil Company, Dept. J10, Sixty Wall Tower, New York 5, New York—or contact your nearest Cities Service office.

CITIES  SERVICE
QUALITY PETROLEUM PRODUCTS

Technical Briefs

rudder posts are approximately 800 lb each.

A number of the original castings in this lot were supplied to one shipyard where they were installed after machining and inserting a phenolic bearing. It was found that the castings seeped as a result of a fairly high degree of porosity.

Porosity A Problem

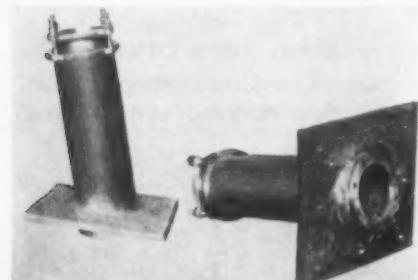
Since these castings are located beneath the waterline of the ship and are supported in wood, serious damage could result from rotting of the wood mounting and loosening the bearing.

Scraping these castings would have involved considerable expense and held up production on ships while new designs were considered, patterns made and the castings poured.

Needed Quick Delivery

The supplier of these castings, with the approval of the Supervisor of Shipbuilding and under U. S. Navy specifications, turned the job of sealing the castings over to Polyplastex Impregnation Corp., a licensee of Polyplastex International, Inc.

Quick delivery of the sealed castings was a critical factor. However, correct impregnation presented two problems, first, the castings contained relatively large voids, in the range of macroporosity, which is the most difficult type of porosity to seal. Secondly, eight of the castings had been finish machined and the phenolic bearings inserted. It was necessary to seal these but at the same time, maintain the dimensions of the bearing face. A special technique was devised to completely seal all castings.



SEEPAGE through rudder post bearing castings was eliminated by impregnating with filler materials.

SHOTBLASTING:

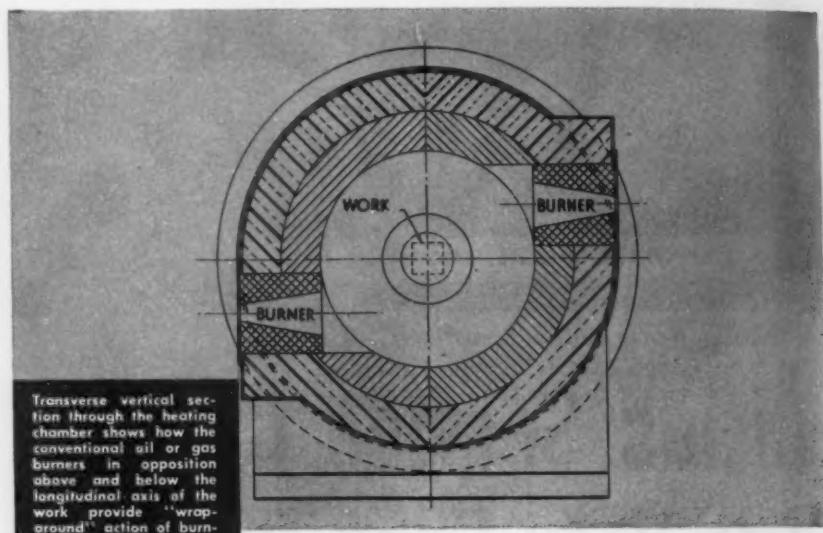
Costs of method used to increase fatigue life can be reduced.

Economies in the shotblasting of automotive parts to give them added life or durability may result from recent research data compiled by General Motors Corp. engineers.

The report was presented to the

Society of Automotive Engineers by Raymond L. Mattson and W. S. Coleman, Jr., of the GM research staff.

They explained that although industries in the past few years have adopted shot peening (or blasting) and other "cold working" methods to increase fatigue life of the particular parts they manufacture, certain variables about



R-S hi-head® heating system

R-S Hi-Head® Heating System prepares bars, slabs, pipe, tubing, and other forms of long, straight stock for forging or heat treatment to meet the most Rigid Standards.

Initial costs are less than with conventional multiple unit methods. Economies are achieved through high speed operation and volume production. Labor costs are reduced as much as 75%.

R-S FURNACE TYPES

Hi-Head • Batch • Rotary Hearth • Continuous Belt Conveyor • Continuous Chain • Continuous Pusher • Continuous Pusher Tray • Pit • Continuous Roller Hearth • Car Hearth



Technical Briefs

these techniques to a large extent are still unexplored.

The report described a series of laboratory tests in which typical automotive leaf springs were shot peened and fatigue tested. The tests, dating back several years, involved more than 100 groups of four spring specimens which were heat treated, cold worked and tested.

Approximately 50 were dissected and analyzed for residual stresses.

In surveying these groups of leaf spring test specimens, the GM research team posted several general conclusions:

For shot peened specimens of this type it appears that there is a minimum shot velocity for each shot size to obtain best fatigue

life. Air pressures greater than this value do not add to fatigue durability, hence are wasteful and costly. The minimum value is considerably lower than that normally used.

Don't Overexpose

For shot peened specimens of this type, unless the degree of coverage (exposure time) is up to some minimum value, best fatigue life is not obtained. By using coverage greater than this value, no significant increase in fatigue life results. Hence, exposure times beyond this point are wasteful and costly.

For shot peened specimens of this type the influence of shot size on fatigue life is not particularly great over a full range of air pressures and exposure times.

For these specimens fatigue life was increased by 20 times over non-peened specimens.

How Fatigue Life Increased

By shot peening specimens while under tensile strain, fatigue life was increased by as much as 200 times over non-peened specimens and 10 times over strain-free shot peening. Greatest benefits were derived from shot peening while under strains greater than 80 pct of yield strength.

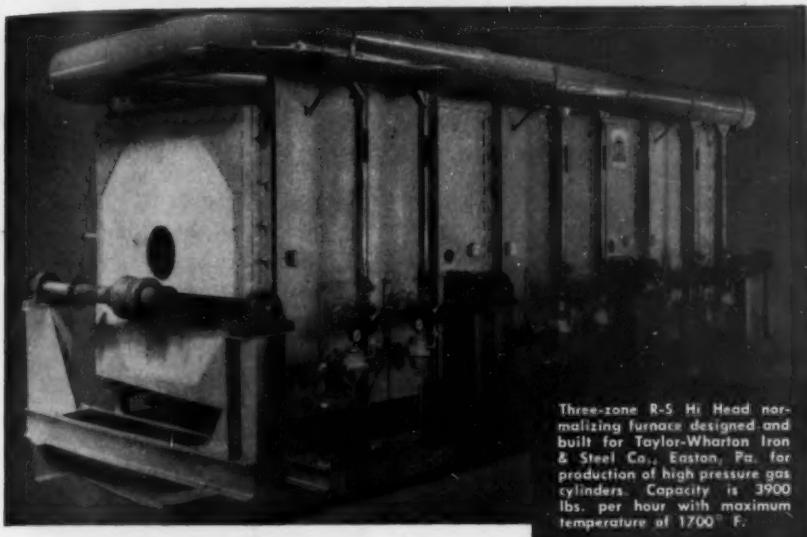
Shot peening specimens of this type introduces residual compressive stresses of the order of 50 pct of the yield strength of the material, regardless of the shot size and velocity. The depth of the compressed layer increases with both shot size and velocity, ranging between 0.006 and 0.026 in. for the treatments used.

A Direct Correlation

Residual compressive stress considerably greater than 50 pct of the yield point can be introduced by shot peening while the surface is under tensile strain.

Although data are limited, the magnitude of residual compressive stress appears to be reduced by fatigue testing. There is a direct correlation between the magnitude of residual compressive stress near the surface and fatigue life of the specimens.

Turn Page



Three-zone R-S Hi Head normalizing furnace designed and built for Taylor-Wharton Iron & Steel Co., Easton, Pa., for production of high pressure gas cylinders. Capacity is 3900 lbs. per hour with maximum temperature of 1700° F.

produces to Rigid Standards

Rigid Standards are met by the rapid and uniform heating. A steel billet 3½ inches square (regardless of length) can be heated to 2300° F. in 14 minutes with uniform heat conduction to the interior of the billet. The "wrap-around" action of the burning gases at high velocities and the high thermal head produce rapid heat transfer.

R-S FURNACE CORP.
4555 GERMANTOWN AVENUE
PHILADELPHIA 44, PENNSYLVANIA

A SUBSIDIARY OF
HARDINGE COMPANY, INC.



SCIENCE:

Automatic computer works a 24-hr day on complex problems.

An automatic computer, called SWAC—National Bureau of Standards Western Automatic Computer—is working 24 hr per day, 5 days per week on complex problems in physics, engineering, mathematics, statistics and metrology. Made in 1950, it is the first of high-speed electronic computers using the fast cathode-ray tube memory capable of making 16,000 additions or 2600 multiplications per second.

Usefulness Extended

By installing a magnetic-drum auxiliary memory, the scope and complexity of problems which SWAC can now handle have been greatly extended. The new memory, based on the magnetic-tape recorder principle, holds 16 times as much mathematical information as the cathode-ray tube memory. It

also acts as a library for numerical methods, which when obeyed, facilitates the solution of a large class of problems.

While the cathode-ray tube memory delivers information very rapidly, it has a 265-word capacity in contrast to the 4096-word capacity of the drum memory. It is this high capacity which makes possible the solution of very large sets of equations.

Built for Speed

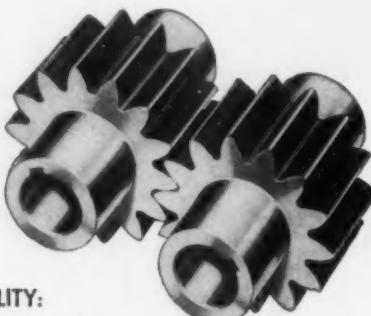
Access to information in a drum memory is generally slow. However, access time in SWAC drum memory has been shortened by (1) transferring numbers in sizable blocks and (2) storing the numbers in the blocks sequentially so that each block forms a channel encircling the drum. When the proper channel is selected, transfer of information starts immediately. Thus, access time per word is reduced to 500 microseconds.

Information on the drum is stored serially in 40-binary digit words. The first 36 digits represent numerical information. The next digit gives the algebraic sign and the last three are empty. Each channel stores 32 words which is a basic transfer block. As the drum rotates at 3600 rpm, transfer of the 32 words takes about seventeen thousandths of a second.

Parallel Operation

The cathode-ray tube memory operates in parallel with the magnetic-drum memory. The two are not in synchronism, therefore, direct communication between the memories is not possible. Information from the drum must first be played back into a vacuum-tube shifting register, then transferred in parallel to the cathode-ray tube memory.

Each digit takes 13 microseconds to play back. With the three empty digit spaces in each word, total delay between words is 39 microseconds.



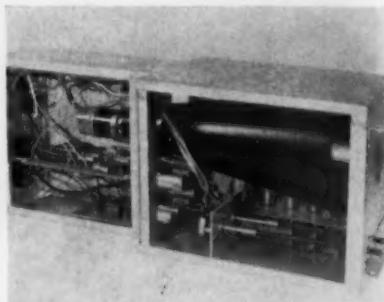
In gears, HQ stands for HIGH QUALITY:

HQ gears must meet the most stringent requirements, must do the toughest jobs efficiently. And for the best in custom-made HQ gears — where quality really counts — many smart gear buyers rely on The Cincinnati Gear Company. Each gear is individually made to meet specific requirements, produced to exacting standards, and backed by Cincinnati Gear's reputation for producing only good gears. If your next job demands HQ custom gears, write, wire or call today for further information.

- SPUR
- WORM
- INTERNAL
- SPIRAL BEVEL
- HELICAL
- HERRINGBONE
- *CONIFLEX BEVEL
- SPLINE SHAFT

*Reg. U.S. Pat. Off.

THE CINCINNATI GEAR COMPANY
"Gears... Good Gears Only"
Wooster Pike and Mariemont Ave. • Cincinnati 27, Ohio



MEMORY of the Standards Western Automatic Computer is partly dependent on 37 cathode ray tubes such as this.



DOTS AND DASHES from the face of one of the cathode ray tube units make up a memory pattern.

Technical Briefs

WELDING:

Automatic welding machine speeds output, improves quality.

Improved weld quality and higher rates of welding production have been attained with a new automatic welding machine recently developed by welding engineers of The National Supply Co., Torrance, Calif.

Put to work in the plant of Huford Machine Works, Redondo Beach, Calif., makers of hydraulic presses and stretch-wrap forming machines, the machine has helped cut welding costs while increasing welding output.

Base, Track Adjustable

The new welding unit is a fully automatic submerged-melt welding machine incorporating a standard welding head from an older type machine. Base and track assembly is adjustable for fast alignment with the work. Track sections may be added for welding longer work pieces.

Welding head position is adjustable vertically and laterally on the carriage, and angular positions are provided by hinging the welding head on the end of the horizontal supporting arm.

Welding speed is controlled by varying the speed of the carriage. Two 600-amp welding generators supply current to welding wire $\frac{3}{32}$ to $\frac{1}{4}$ in. in diameter. Flux is fed by compressed air.



WELDING SPEED on this new welding unit is controlled by varying the speed of the carriage.

IN PEACE TIME DEFENSE TIME EVERY TIME

MAKE "Standard" YOUR SOURCE
FOR WELDED TUBING EFFICIENTLY PRODUCED!



**Specially Designed
New Modern Plant with
Complete Facilities for Production of:**

- ★ Welded Mechanical ★ Boiler and Heat Exchanger
- ★ Welded Stainless ★ Exclusive "Rigidized" Patterns

Complete Range of Electric Weld Tubing for Structural, Mechanical and Pressure Applications

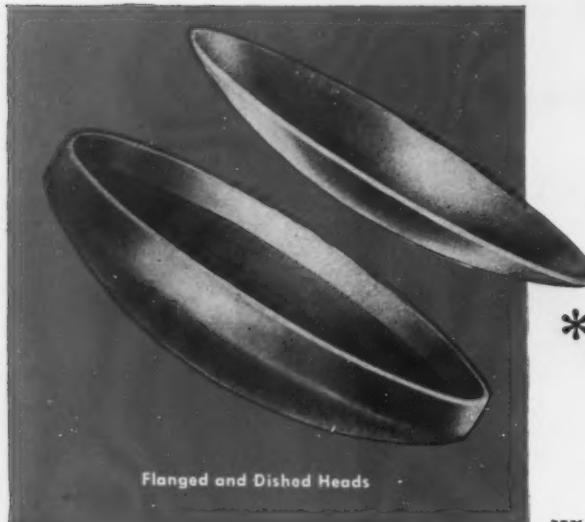
Here in this great new plant are the most modern and complete facilities for the manufacture of Welded Steel and Stainless Steel tubing found anywhere. Let "Standard's" specialists help you!



**ROUND • SQUARE • RECTANGULAR • SPECIAL SHAPES
Including UPSET • FLARED • FLANGED • TAPERED**

★
STEEL TUBING SIZES: $\frac{1}{8}$ " O.D. to $5\frac{1}{2}$ " O.D. .028 to .260 wall
STAINLESS SIZES: $\frac{3}{8}$ " O.D. to 3" O.D. .028 to .095 wall

heads---you win



*when they're made by

CLAYMONT

Whatever your needs in flanged and dished heads, you're a winner every time when you call for heads by Claymont.

We can always meet your most exacting specifications because with us the spinning of flanged and dished heads is more than just a job—it's an art into which we put the most painstaking care and specialized know-how.

Our flanging department can supply you with flanged and dished heads in diameters from 9 inches to 19 feet and in gauges from 3/16-inch to 6 inches. Made in carbon steel, alloy steel or with stainless steel cladding. We are also prepared to handle head forming operations on both ferrous and non-ferrous metal circles supplied by the customer.

Other Claymont products include Stainless-Clad Steel Plates, Alloy and Carbon Steel Plates, Large Diameter Welded Steel Pipe.

Write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

THE COLORADO FUEL AND IRON CORPORATION—Denver, Colorado

PACIFIC COAST DIVISION—Oakland, California

WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit

New Orleans • New York • Philadelphia

CANADIAN OFFICES: Toronto • Winnipeg • Edmonton • Vancouver

CLAYMONT STEEL PRODUCTS

PRODUCTS OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION



THE IRON AGE SUMMARY . . .

- Premium prices falling like tenpins; others firm
- Business looks good through first half of 1954
- Cancellations tapering off, are past their peak

Premium steel prices are falling like tenpins, but "regular" mill prices remain firm. Although overall consumer demand is expected to remain high for at least several months, steel producers have pretty well caught up with demand for most of their products. After more than 3 years of guns-plus-butter shortage steel buyers have become extremely cost conscious. Once again they are rating price more important than delivery.

Result is that high cost producers can no longer sell at premium prices. Faced with the alternative of shading prices toward competitive levels or reducing operations they are acting as expected: They are reducing prices.

At least 10 steel producers have recently lowered premium prices, most of the cuts coming in the past 2 weeks. The producers are pretty well spread geographically; three being in Michigan, three in Illinois, three in the Pittsburgh area, and one in the East.

Products reduced also cover a wide range including pig iron, alloy billets, blooms and slabs; hot and cold-rolled sheets and strip; cold-rolled spring steel; cooperage hoop; manufacturers' wire; carbon and alloy plates and bars; high-strength, low-alloy sheets, strip and plates; and stainless steel.

Premium prices have not in every case been slashed all the way to competitive levels. But they will be if the high cost producers find themselves still unable to sell enough to keep their operations at a satisfactory level. Chances are competition will continue to force their hands.

Despite the premium price cuts, regular mill prices remain firm. There is nothing in sight to suggest any early change in base prices of the bulk of the industry. However, most companies will absorb freight on an individual basis whenever it becomes commercially desirable to meet competition on a specific product.

The steel market actually appears stronger than it has for several weeks. Now that the

hysteria over returning competition has died down, these conclusions may be drawn:

(1) The steel market is fundamentally sound. Outlook is for better than average business at least through the first half of 1954.

(2) Order cancellations, though still sizable, have been tapering off and are believed past their peak.

(3) Consumer inventory correction, largely responsible for softer market tone in recent weeks, is about two-thirds accomplished, should be completed before year's end.

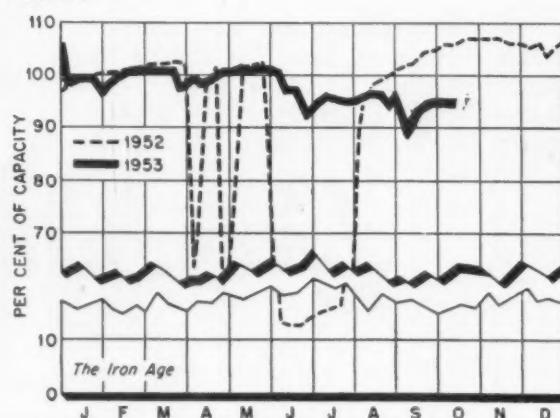
(4) Freight absorption and premium price adjustments brought about by more competitive conditions represent no fundamental weakness in steel prices.

(5) Steel producers operating at 96 pct of rated capacity are probably making more money than they did while operating at 100 pct or more. This is because the slight decline in the ingot rate largely reflects disappearance of high cost conversion market and return of high-cost facilities to standby basis.

Steel Operating Rates

	Week of Oct. 18	Week of Oct. 11	Week of Oct. 18	Week of Oct. 11
Pittsburgh	96.0	98.0*	Detroit	98.0
Chicago	97.5	97.0	Birmingham	96.5
Philadelphia	96.0	96.0	Wheeling	100.0
Valley	96.0	98.0*	S. Ohio River	78.5
West	99.0	98.5*	St. Louis	95.5
Cleveland	95.0	96.0*	East	111.0
Buffalo	106.5	106.5	AGGREGATE	96.0
Beginning Jan. 1, 1953, operations are based on annual capacity of 117,522,470 net tons.				

* Revised

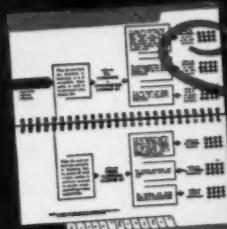


How

ONE TOOLMAKER . . .



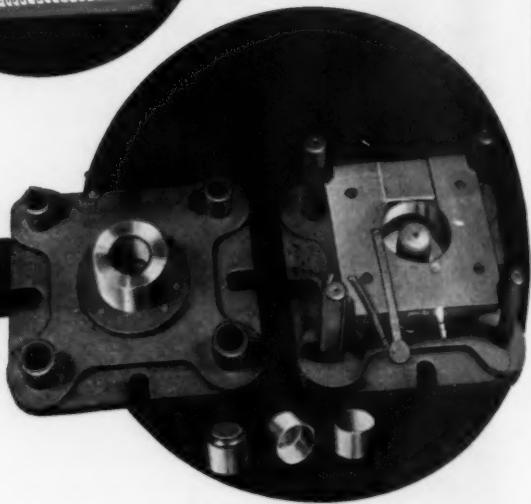
USED THIS GUIDE . . .



—then use
HAMPDEN
(Oil-Wear)
or No. 610
(Air-Wear)



TO HOLD DOWN UNIT COSTS . . .



AT which step in your tooling process would you welcome real help in reducing tool and die costs? Tool Steel Selection? Heat Treating?—or on-the-job "Trouble-Shooting"? Here's how you, like the maker of the Dies shown here, can start to reduce costs with a Method that helps you at all 3 steps.

First, to simplify selection, use the handy Selector Section in the Carpenter Matched Tool Steel Manual. Quickly and surely, it enables you to put your finger on the proper steel for best results. Next, to further insure tool and die performance, use the Manual's complete heat treating instructions—they have been simplified beyond anything previously known. It's easy to get started—use the Carpenter Matched Set Method to help you "trouble-shoot" your present tool and die jobs.

For better, lower-cost tooling, put this practical, easy-to-use Method to work, now. Ask for the 189-page Carpenter Matched Tool Steel Manual—just see your Carpenter representative. The Carpenter Steel Company, 121 W. Bern Street, Reading, Pa.

Job:

Compound Blank and Draw Die for forming .031", 1/4-hard brass Vent Valve Bodies at the rate of 103 per minute on a punch press.

Problem:

Unit costs were on the upswing because the old dies wore too rapidly, causing frequent and costly machine shutdowns for regrinding.

Solution:

Looking for a die steel with maximum wear resistance, the toolmaker referred to the Selector Section in the Carpenter Matched Tool Steel Manual, and quickly arrived at Carpenter Hampden (Oil-Wear).

Heat Treatment:

Simplified instructions in the Manual were followed.

Results:

2 hours of costly machine downtime were eliminated each day—production per grind rose over 300%! As a matter of interest, the toolmaker takes off approximately .0005" per stoning and gets about 100 grinds from the Blank and Draw Die.

IMMEDIATE DELIVERY FROM LOCAL STOCKS!

Call Your Nearest Carpenter Warehouse or Distributor



Carpenter STEEL

Matched Tool and Die Steels

Export Department: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U. S. A. and Canada

Markets at a Glance

Automen Stick to Substitutes . . . Freeing of nickel has not created great demand from automakers for high nickel triple alloys. Auto manufacturers who worked out successful substitutes during nickel restrictions found they generally cut costs. As a result they are sticking with them. One automotive user which formerly employed 4620 nickel-molybdenum for ring gears plans to continue using a chromium molybdenum substitute. Another big producer found it could substitute TS 8600 steels satisfactorily and will probably not return to high nickel alloys.

Tinplate Expansion . . . A new tinplate mill is definitely scheduled to begin production in the Chicago area in mid-1954. Although tinplate market is currently weak—due mainly to heavy inventory accumulation early this year as a strike hedge—Chicago area consumes more tinplate than it produces.

Foundry Equipment Orders Up . . . Shipments of new foundry equipment for the first 8 months of the year are about 8 pct behind the pace set during the same period last year. New orders, however, show a 20 pct increase over 1952, reports Foundry Equipment Mfrs. Assn.

Admiral Refrigerators Make Strong Gain . . . Sales of Admiral refrigerators are running 82 pct ahead of last year and the company expects continued brisk business through the end of the year. Company spokesman said a promotion offer of a free electric blanket plus a price reduction has boosted sales of one refrigerator model 208 pct.

Radio Sales Spurt . . . Government economists keeping tabs on retail activity say radio sales began to increase in tempo several months ago. The trend shows no signs of slowing. CBS-Columbia reports its radio sales during first 8 months of 1953 amounted to more than 8 million sets, 2 million more than were sold in the same period last year.

New Titanium Producer? . . . A new titanium producer may be on the horizon as a result of several years' joint research by Monsanto Chemical Co. and National Research Corp. They are reported to have developed a method for producing crystalline titanium, bypassing the sponge stage. Discussions are under way with Defense Materials Production Agency for a government contract to support building of a plant.

Cut Steel Prices . . . Great Lakes Steel Corp. has posted new lower prices on high-strength, low-alloy hot-rolled strip, sheet, bars and plate; high-strength, low-alloy cold-rolled strip and sheet; carbon and alloy hot-rolled bars; and carbon steel plate. Cuts range from \$3 per ton to as much as \$13 per ton.

Follansbee Adds Warehouse . . . Follansbee Steel Corp. plans to build a \$750,000 warehouse on an 8-acre site at Wallingford, Conn. Construction is to begin in 4 to 6 weeks, with completion set for June, 1954. The 54,000 sq ft building will be three times the size of Follansbee's warehouse at Fairfield, Conn. Equipment will include 10-ton cranes, slitters, shears, edging rolls, and roller leveling cut-up lines.

Shell Steel Cuts . . . Steel producers are expecting another reduction in shell steel requirements. They expect shell plate needs to be off by 20 pct, and projectile steel by 30 pct. This will relieve overworked soaking pit capacity, ease scheduling, and permit greater ingot output—if needed.

To Start Bar Mill . . . Production is set to begin next month on bars, small shapes and reinforcing bars at U. S. Steel Corp.'s Fairless Works. Shipments, however, will be light during the initial period. Price on these items will be \$4.30 per 100 lb.

Selling Sheets . . . Starting Oct. 19, Continental Steel Corp. is offering hot-rolled sheets for sale. Price, f.o.b. Kokomo, Ind., is \$4.025 per 100 lb for 18 gage and heavier.

Prices At A Glance

(cents per lb unless otherwise noted)

Composite Prices	This Week	Last Week	Month Ago	Year Ago
Finished Steel,				
base	4.634	4.634	4.634	4.376
Pig Iron (gross ton) ..	\$56.59	\$56.59	\$56.59	\$55.26
Scrap, No. 1 hvy.				
(gross ton)	\$32.83	\$32.33	\$35.33	\$42.00
Nonferrous Metals				
Aluminum, ingot	21.50	21.50	21.50	20.00
Copper, electrolytic ..	29.50	29.50	29.50	24.50
Lead, St. Louis	13.30	13.30	13.30	13.80
Magnesium, ingot ...	27.00	27.00	27.00	24.50
Nickel, electrolytic ..	63.08	63.08	63.08	59.58
Tin, Straits, N. Y.	80.50	80.25	82.50	\$1.21%
Zinc, E. St. Louis	10.00	10.00	10.00	13.50

Nonferrous Markets

Strikes Hit Chile Copper Output

Two Anaconda properties shut down . . . Defy Chilean government appeal . . . Copper price holding in absence of U. S.-Chile agreement . . . Scrap higher—By R. L. Hatschek.

Strikes have shut down both Anaconda Copper Mining Co.'s Chuquicamata and Potrerillos operations in Chile. The action taken by workers was in defiance of Chilean government appeals to at least postpone the walkouts. Chile's president has termed the stoppages "communist inspired."

Meanwhile, despite unofficial reports that a price for Chile's 100,000-ton or more copper surplus merely awaited approval of a new cabinet, no official word has come out of either Washington or Santiago.

It seems fairly certain that State Dept., which is conducting the negotiations, wants to limit Chile's selling sphere to the free world. The Chilean representatives may well be balking at this point.

Production Drops . . . Statistics reported by the Copper Institute for September show a significant drop in refined production outside the U. S. Output was 68,986 tons as compared to 90,340 the month before. Despite this decline, refined stocks held outside the U. S. climbed 27,116 tons to 236,336 tons. This resulted from continuing low deliveries, 47,039 tons.

In the U. S. refined production climbed almost 6000 tons to 114,760. With deliveries—104,886 tons

—running about the same as the previous 2 months, stocks in the U. S. declined 5918 tons to 72,907.

Market Steady . . . With consumers reported to be showing some interest in November copper supplies, the market is showing a bit more steam. Long-range prediction is still that the copper price will ease but delays in settling the U. S.-Chilean negotiations are supporting the present market price.

While ingot makers and custom smelters were maintaining earlier price levels for their products, scrap copper buying prices are inching upward. This is also true of scrap dealers buying prices. General level for dealers at New York is now 23¢ per lb for No. 1 heavy copper and wire, 21¢ for No. 2 copper and up to 18½¢ for light copper. Some other copper-base scrap items have also edged up.

Aluminum the Reverse . . . The opposite is true of aluminum. Dealers in several areas are paying less and getting less for their aluminum scrap and secondary ingot prices are also getting a shading. Off anywhere up to ¾¢ per lb last week, several quotations this week are ¼¢ lower. Deoxidizing aluminum, which dipped up to 1¾¢ last week, held steady.

Breaking Records . . . Setting new production records is getting to be old hat for the aluminum industry. They did it again in August with an output of 110,545 tons, topping the previous high of 109,285 tons set in July according to Aluminum Assn. figures. This brings total production for the first 8 months of the year to 818,994 tons—a figure that has been topped by only 3 full years.

ALUMINUM SHIPMENTS

(net tons)

	Aug.	July
Sheet & Plate, total	51,653	53,619
Non-Heat-Treatable	38,855	40,997
Heat Treatable	12,797	12,722
Foil	4,631	4,703*
Extruded Products, total	12,075	13,007*
25, 35, 525, 615, 635	8,546	8,475*
All Other Alloys	3,527	4,532*
Castings, total	11,773	12,352
Sand	1,589	1,740
Permanent Mold	5,002	5,271
Die	5,182	5,333
Tube, Drawn & Welded,		
total	2,813	2,303
25, 35, 525, 615, 635	2,096	1,804
All Other Alloys	717	578
Rod & Bar, Rolled & Drawn	7,737	9,002*
Wire, Bare, Not Conductor	1,334	1,709
Electric Conductor (Aluminum Content)	3,616	5,033
Forgings	1,953	2,225*
Miscellaneous Products	1,115	1,113

* Revised.

At their present clip, the big three will siphon close to 1.26 million tons of aluminum out of their potlines before 1953 is over. Water shortages, the industry's prime gremlin, are not likely to be so troublesome as in 1951 and 1952.

There have been some hydro-power shortages in the TVA area but aluminum producers there have not been touched. In the Pacific Northwest the power situation is close and some steam-generated electricity has been used but no aluminum production has been lost as a result.

To Start Tin Talks . . . U. S. representatives will participate in a United Nations conference on tin prices and supplies, tentatively scheduled to begin in Geneva, Switzerland, on Nov. 16. But those representing the U. S. will not be empowered to ratify any agreements resulting from the talks.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Oct. 14	Oct. 15	Oct. 16	Oct. 17	Oct. 19	Oct. 20
Copper, electro, Conn.	29.00—	29.00—	29.00—	29.00—	29.00—	29.00—
	30.00	30.00	30.00	30.00	30.00	30.00
Copper, Lake delivered	30.125	30.125	30.125	30.125	30.125	30.125
Tin, Straits, New York	79.25	79.00	79.25	....	80.50	80.50*
Zinc, East St. Louis	10.00	10.00	10.00	10.00	10.00	10.00
Lead, St. Louis	13.30	13.30	13.30	13.30	13.30	13.30

Note: Quotations are going prices

*Tentative



When Nobody Knows the Answer

One of these days you may come face-to-face with a metal problem that does not seem to have an answer.

That is the time to think of these International Nickel Company metallurgists. They are constantly improving and modifying nickel alloys to meet new conditions. They are always ready to help you with specific problems involving metals for destructive service conditions.

Over the past 50 years, Inco has developed a family of metals for hundreds of different applications. In one branch of the family, for example, is a group of heat-resisting alloys—Inconel®, Inconel "X"®, the Nimonic® Alloys and Incoloy®—all now important in high temperature work.

Elsewhere on the family tree, you will find other alloys—each with certain special characteristics. Often, there is a better-than-ever chance that one of Inco's alloys offers exactly the properties you are looking for.

Of course, this does not mean that somebody at Inco can dip into the files and come up with a pat answer to every new problem. All the answers have not been found yet. But a tremendous amount of research has been done, and you can probably benefit in one way or another from it.

When nobody knows the answer, Inco's metallurgists keep going until they have investigated all possible metals and alloys that might

do the job. In fact, the men in Inco's Technical Service (and in their Corrosion Engineering and High Temperature Engineering Services, as well) have one primary goal: to help you determine whether an Inco Nickel Alloy or some other metal will serve your purpose best.

No matter what your metal-selection problem may be, all the technical facilities of Inco are available to help you solve it. There is no charge, no obligation of any kind. For prompt technical help whenever you need information about metals, all you have to do is get in touch with: "Technical Service."

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Iron and Steel Scrap Markets

Export Freeing Boosts Trade Morale

Scrap men feel Commerce Dept. action gives good lever against further market softening . . . Price rises continue in most areas . . . Continued uptrend predicted for fall.

Talk of the trade this week was the government's action in freeing scrap exports. (For details see p. 79) While no definite transactions had been reported at press time, feeling was strong that shipments would start overseas soon.

No one expected U. S. mills to be stampeded into buying by the thought of freed exports, but scrap men agreed the Commerce Dept. action should have a tonic effect on orders and prices. At least it will permit siphoning off any surpluses that may develop. And the psychological effect should not be underrated.

General firming of the market was reported from most districts this week. Price advances did not occur in all areas or grades, but the overall effect was definitely of a strengthening market. And in several areas which lagged behind the general advance, trade sources were predicting early improvement with more confidence than has been heard in weeks.

THE IRON AGE Scrap Composite rose 50¢ this week to \$32.83.

Pittsburgh—The market is showing signs of strength. Dealers are reported holding on to scrap, evidently in the belief that prices will move upward once more. It is felt that freeing of scrap exports will relieve pressure on suppliers, but most sources doubt it will have an immediate effect on prices. Meanwhile, price of openhearth grades remained unchanged. Blast furnace and some railroad grades showed more strength.

Chicago—With still no heavy mill buying, Chicago broker prices continued to edge up, and were reflected this week in railroad grades as well as steelmaking material. A minor mill sale of a week ago had become the bottom of the market in relation to broker buying and appraisal put the market a minimum of \$1 to \$2

over the week previous. Sacrifice buying to fill old orders was reported common, with a resulting increasing upward pressure. Added to this was the \$4 increase elsewhere last week.

Philadelphia—Freeing of scrap for export is the main subject of trade talk this week. Most people feel it won't be too big a factor in the immediate area though the secondary effect of siphoning scrap from other districts will be beneficial to this market. Pricewise, there has been no reaction yet. The market tone is a bit firmer on the basis of low phos bundle sales to local openhearth and electric furnace mills and stronger prices brought by recent railroad lists.

New York—Revocation of export controls has brightened the face of the market here considerably. There was no definite export business reported at press time, but expectations were high. Movement generally was somewhat improved, and scattered orders raised steelmaking grades \$1. Improvement was expected soon in turnings and cast.

Detroit—Absence of mill buying has wiped out some of the optimism that crept into the market last week. Prices appear to be stabilized at present levels, however, and an offer to buy No. 2 grades at about \$2 below the accepted price met with strong resistance. Cheerful sentiment of a week ago has not been backed up by buying and the trade is marking time awaiting closing of automotive lists.

Cleveland—No. 2 steel went up \$2 on appraisal to \$29 Cleveland and \$32 Youngstown as market bounced back from what many dealers and brokers termed an "unrealistic" level. No. 1 machinery cast and malleable also jumped \$2 to \$46 delivered as railroad cast sold for \$46.50. Lifting of the ban on exportation is already having a firming psychological effect in this area. Valley forecasters expect to see some price increases on premium grades in the near future.

Birmingham—There is a general feeling among scrap brokers in this area that prices have reached the bottom and will go up in the near future. Many dealers in the South are refusing to ship at present prices. Brokers were informed that some northern mills had increased prices nominally, but the increase has not yet reached this district since all of its mills were out of the market this week.

St. Louis—While there was little consumer buying during the week, brokers were paying higher prices for many items. Purchases were being made either on a speculative basis or to fill outstanding orders on which they say they took a loss. Railroad lists closing the latter part of this week include St. Louis & San Francisco, 41 carloads, Missouri Pacific, 115 carloads, Chicago, Burlington & Quincy 3300 tons.

Cincinnati—Scrap dealers here were marking time this week while waiting for mill buyers to declare themselves on November tonnages. Mills reportedly will hold back at least for a while so as not to disturb prices set earlier this month. General feeling here is that Cincinnati will follow the upward trend already evident in other areas.

Boston—The market is definitely stabilizing here, with some upward price adjustments. Bundles rose \$3 to \$4 a ton, and machine shop turnings \$1 to \$2. Movement in heavy melting grades is quickening, but prices at press time were as yet unchanged. Cast prices remain nominal in the absence of business.

Buffalo—Scattered buying by small consumers and stronger tendencies in other areas lifted scrap prices here by from \$2 to \$4 a ton. Some dealers felt recent nominal declines had been a bit too sharp. Although sales volume on new business was not large, one of three leading mill consumers bought limited tonnage. A declining flow of collections was also regarded as a bullish factor.

West Coast—The San Francisco market continues sluggish. Both mills and dealers still have high inventories. Exporting of scrap will probably start within 10 days. Some predict a soft scrap market for at least a year.



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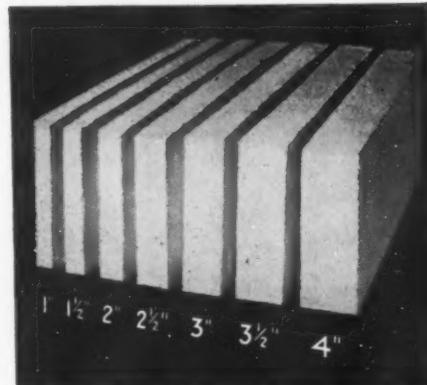
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Long, efficient service life—Superex maintains high insulating value indefinitely—will not disintegrate in the service for which it is recommended.

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D. C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	2000	Whse.	Mill	600	220/400
1	900	Whse.	QM	250	140/170
1	900	Whse.		250	450/550
1	825	Whse.		250	95/190
1	600	Al. Ch.		250	400/800
1	580	Whse.	CC-318	600	300/900
1	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
1	380	Whse.	CB-5094	250	575/1150
1	200	G.E.	MPC	250	300/720
1	200	Rel.	1970T	250	720
1	200	Whse.	CB-5113	250	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	250	140
1	150	G. Wh.	RSH-TEFC	250	950
1	150	Whse.	HK-151B	250	900/1800
1	150	Whse.	HK-201	250	360/950
1	80/120	G.E.	MCF	250	250/1000
1	100	Whse.	HK-101	250	450/1000
1	100	G.E.	CDP-115	250	1750

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1500	G.E.	MT-498	2300	720
1	1200	G.E.	MT	2300	270
2	1000	A.C.	Mill	2300	240
1	500	Whse.	CW	550	850
1	500	G.E.	L-M	2300	900
1	400	Whse.	CW	440	514
1	400	G.E.	CW-1218	2200	435
1	350	G.E.	MT-442Y	2300/4000	253
1	300	G.E.	MT-565Y	2300	900
1	270	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-5598	2300	1800
1	250	Al. Ch.		550	900
1	200	Cr. Wh.	26QR	440	505
1	200	G.E.	IM-16	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150 (unused)	Whse.	CW	2300	435
1	150	G.E.	IM-18	440	600
1	125	G.E.	IM	440	435
1	125	Al. Ch.		440	720
4	125	G.E.	MT-565Y	440/2300	455
5	100	G.E.	IM	440	600
5	100	A.C.	ANT	440	695
1	100	G.E.	IM-16	2200	435
1	100	Whse.	CW-268A	440	700

SQUIRREL CAGE

Qu.	H.P.	Make	Type	Volts	Speed
2	850	G.E.	FT-550BY	440	3570
2	450	Whse.	CB-550B	2300/4150	254
1	300	G.E.	IK-17	440	580
1	200	G.E.	KT-557	440	1800
1	150	Whse.	CB-550B	440	850
1	150	Whse.	CB	440	580
1	150/175	G.E.	IK	440	900/450
2	125	Al. Ch.	ARW	2200	1750
1	125	Whse.	MR	440	485

SYNCHRONOUS

Qu.	H.P.	Make	Type	Volts	Speed
2	3000	G.E.	TB	2300	257
2	2100	G.E.	ATI	2300	360
2	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
2	750	G.E.	ATI	2300/12000	600
1	450	Whse.		2300	450
2	550	G.E.	TB	2300	154

M-G Sets—3 Ph. 60 Cy

Qu. K.W.	Make	R.P.M.	D.C.	A.C.
			Volts	Volts
2	2000/2400	G.E.	450	250/300
2	1750/2100	G.E.	514	250/300
1	9000	G.E.	25c	600
2	3000	G.E.	514	600
2	1500	G.E.	514	600
1	1500	G.E.	720	600
1	1500	G.E.	800	600
1	1500	G.E.	514	80/115
1	1000	G.E.	900	600
1	1000	G.E.	900	360
1	1000 (SU)	G.E.	900	250
1	750	Whse.	900	275
1	750	G.E.	514	30/115
1	600	G.E.	720	350
1	500	G.E.	720	135
1	500	Whse.	900	125/250
1	500	Whse.	1200	125/250
1	400 (SU)	Cr. Wh.	1200	125/250
1	150	Whse.	1200	275
1	140 (SU)	Cr. Wh.	600	125/250
1	100	G.E.	1200	250
1	100	G.E.	1170	125

FREQUENCY CHANGER SETS

Qu. KW	Make	Freq.	Voltages
1	13500	Whse.	25/60 13200/13200
1	3000	G.E.	25/60 2300/2300/4000
2	2500	G.E.	25/62.5 2300/2300
1	1000	G.E.	25/55.3 4400/2300
1	500	Al. Ch.	2500 11000/2300

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The Clearing House

NEWS OF USED AND REBUILT MACHINERY

Profit Dip Is Less . . . Used machinery sales are still slow in Cleveland but please omit flowers. For the most part dealers are assessing the situation calmly and look ahead with optimism.

Most dealers admit business volume is off about 40 pct from last year's backlog-jammed third and fourth quarters but say profits are down only 10 to 15 pct.

Marginal operators have disappeared and established firms are doing what comes naturally in any belt-tightening period. Inventories have been curtailed by most firms, and the trade is busy talking, quoting and in some instances selling up 15 pct."

List Below Book . . . Dealers handling electric motors say most types of equipment are going begging. Demand for fractional hp units is practically nil because the market is presently flooded with new government equipment. More than one dealer said these motors are frequently listed well below book value. Dealers report heavier power units in the 100 to 150-hp category are somewhat easier to move.

Demand from the stamping industry is weak and as a result sales of used presses are off. Prices on late model tools have come down about 10 pct since January but are generally still prohibitive. Older machinery of 1940 vintage has dropped 10 to 25 pct in price, but many dealers still complain they are finding it difficult to locate outlets for antique trade-ins.

Back in the Market . . . Dealers who are optimistic about the used machinery market bouncing back

expect the improvement to come by second quarter of next year. By that time, they believe civilian producers who are currently waiting for the price of desirable tools to drop will be back in the market. If dealers in the Cleveland area are right, competition should force used machinery prices down.

A reported surge in demand for new tools is also regarded by many used machinery dealers as an indicator of better business ahead.

The rebuilding wave which hit the area in the wake of the Livonia fire has largely subsided. Once again rebuilders will have to revert to the hard-sell in a more normal market.

Support MDNA Plan . . . Machinery Dealers National Assn.'s statistical program is being warmly received by most Cleveland dealers. Report is that the majority of them are giving the program their wholehearted support, since they are convinced the program will help them.

MDNA is making a concerted effort to obtain sales statistics from all its members. If it succeeds in getting returns from a large majority of its 217 dealer members on a continuous basis, the association will have achieved one of its most important goals.

Hold Sale . . . Auction sale of equipment and plant of Edge Moor Iron Works, Edge Moor, Del., will be held Oct. 27-28, starting at 10 a. m. on both days. Machinery and plant may be inspected from Oct. 22 to sale date.

Heavy fabricating equipment, including large bending rolls, press brakes, shears, punches, drills, pipe machinery and hammers will be featured at the sale. Also on the block will be an extensive array of welding machinery and positioners along with machine tools such as turret lathes, tool room and engine lathes, horizontal and vertical boring mills, plate drills.